Developing Visakhapatnam Region as a Global Economic Hub

November 2025

DATA SOURCES AND DISCLAIMER

This document is an indicative Economic Master Plan for the Visakhapatnam Economic Region (VER). It describes the growth drivers that will steer the region to its economic goals by 2032 and lays out aspirations for 2047. The data used for the purpose of this document is derived from various public sources and the inputs received from the state government. The data regarding GDP, workforce and economic baselines is sourced from the Directorate of Economics and Statistics, Government of Andhra Pradesh. Estimates have been made for the newly split districts basis erstwhile economic and geographical split data. Information regarding existing landbanks, ongoing projects, and planned investments is sourced from state agencies (such as Visakhapatnam Metropolitan Region Development Authority, Andhra Pradesh Industrial Infrastructure Corporation, Andhra Pradesh Economic Development Board etc.), and state departments (such as offices of the District Collector, planning department, industries department, ITE&C department, tourism department etc.)

The priority of the plan is to understand the strengths of the region and identify economic growth levers that can be translated into projects for implementation. The report is intended to be an economic and employment master plan and is not intended to be a physical master plan.

The proposed projects and suggestions laid out in this document are directional, derived from stakeholder consultations, land availability and preliminary market scans. They must be tested and further developed through more detailed economic, financial, environmental and social feasibility studies before implementation. Maps have been prepared using multiple sources. Location of infrastructure and proposed projects are illustrative and not to scale.

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NARA CHANDRABABU NAIDU

CHIEF MINISTER
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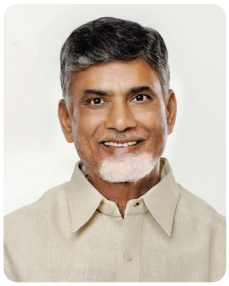
AMARAVATI



MESSAGE

Andhra Pradesh has always believed in the power of bold aspirations, grounded in focused execution. As India enters Amrit Kaal, and moves towards becoming a $30 trillion plus economy by 2047, our ambition is not only to contribute to this national journey but also to help shape it. The state has set an ambitious target of becoming a $420-430 billion economy by 2032 and a $2.4 trillion plus economy by 2047, charting a structured pathway towards inclusive, sustainable, and future-ready growth. The Visakhapatnam Economic Region (VER) will be pivotal to this transformation.

It gives me immense pleasure to present to the people of Andhra Pradesh this Economic Master Plan, which sets out the vision to establish VER into an industrial and technological hub of national significance. With this bold and execution-ready plan, we aim to elevate VER into an urban cluster contributing $125-$135 billion to the state's GDP and creating an additional 2-2.4 million jobs by 2032. I am proud to note that VER is the third region to publish such a plan, under the Government of India's G-Hub programme.

VER is home to 31% of Andhra Pradesh's population and contributes over 30% to the state's GDP. The per capita GDP of the region is nearly $3200, 20% higher than the national average. VER's continued development is central to both India's 2047 aspiration and the 'Swarna Andhra@2047' vision.

VER's foundation lies in its formidable strengths: a diversified economy anchored by a strong manufacturing base in steel, pharmaceuticals, and medical devices; a robust port and logistics network; a leading agricultural sector excelling in eggs and fisheries; and a rapidly expanding IT and data centre ecosystem.

This plan harnesses these endowments through 7 priority growth drivers, translated into 65-70 interventions across prioritised projects, enabling policy reforms, and institutional shifts. I am especially proud that this plan positions VER as a future lighthouse of sustainable development. By 2032, the region aims to source 50% of its power from renewable energy, deploy 4,000 electric and CNG buses, and achieve 100% waste segregation and MSW processing through a network of advanced CBG and waste-to-energy plants.

To enable this, we envisage a total investment of $100-115 billion, with the private sector as a key partner, supported by both central and state governments. The journey has already begun- the government's $4-5 billion investment in core infrastructure and connectivity projects in the region, has helped us catalyse over $20 billion in capital commitments from our private sector partners.

My government is committed to creating an enabling ecosystem built on a superior ease-of-doing-business framework, pre-approved land banks, and best-in-class policy reforms.

This is more than just an economic plan. It is a statement of intent and a promise of inclusive prosperity, reflecting my government's commitment to building a region where every citizen finds opportunity and every investor finds confidence. I invite industries, entrepreneurs, institutions, and citizens to join this transformation and help shape a region poised to lead India's next wave of growth. My compliments to the NITI Aayog team, the Institute for Sustainability, Employment, and Growth (ISEG) Foundation, and the state government officials for their work on this Economic Master Plan. We look forward to their continued support for turning this vision into a reality.

Amaravati.
11.11.2025

(NARA CHANDRABABU NAIDU)

CHIEF SECRETARY

Foreword

Sri K. Vijayanand

Chief Secretary, Government of Andhra Pradesh

Andhra Pradesh has set its sights on becoming a $2.4 trillion economy by 2047, and the Visakhapatnam Economic Region (VER) will be central to that ambition. Spanning 38,000 square kilometres across nine coastal districts, VER already contributes over 30% to the state's GDP and is poised to become a $125-$135 billion economy by 2032.

This Master Plan provides the strategic direction to unlock the region's full economic potential by focused interventions across 7 prioritised growth drivers. With major investments in roads, housing, ports, airports, industrial parks, and digital infrastructure already underway, the region is on track to become a gateway for manufacturing and logistics in Eastern India, as well as a hub for clean industries, services, and skilled talent.

What excites me most is our vision for inclusive, region-wide growth, one that builds on each district's natural strengths. Visakhapatnam and Vizianagaram will lead as knowledge and service hubs, powered by IT, data centres, care economy, education, and tourism. Anakapalli, Srikakulam, and Kakinada will drive the next wave of port-linked industrialisation, with the ambition of ranking amongst India's top three manufacturing regions for steel, chemicals, and pharmaceuticals. East Godavari, Alluri Sitharama Raju, Parvathipuram Manyam, and B.R. Ambedkar Konaseema will scale their agricultural economies with a renewed focus on technology adoption, organic production, secondary processing, and improved market access.

The plan lays out 65-70 high-impact interventions aimed at creating over 2-2.4 million incremental jobs and attracting upwards of $85 billion in private investment. I am particularly enthusiastic about the best-in-class new-age cities being planned in VER, such as the Bhogapuram Aerocity, the Vizag Bay City, and Vizag 2.0. These urban clusters will serve as engines of growth, attract global capital, improve liveability, enhance tourism appeal, and anchor a world-class quality of life on the east coast.

Andhra Pradesh offers the most facilitative and responsive environments for investors today. The state government is fully committed to fast-track this transformation through proactive policy support, coordinated execution, and bold institutional reforms aimed at making VER one of the most attractive destinations for investment in India.

I congratulate NITI Aayog, respective state ministries and departments, and ISEG Foundation for preparing this comprehensive blueprint. We look forward to working together to make VER a leading growth hub for a Swarna Andhra Pradesh and a Viksit Bharat by 2047.

(K. Vijayanand)

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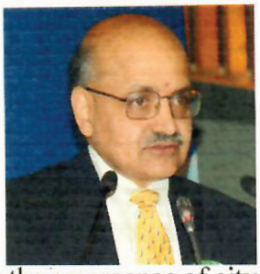


PREFACE

India's ambition to become a $30 trillion economy by 2047 will depend on the emergence of city regions capable of driving productivity, job creation, and investment at scale. Urban centres will play a pivotal role in achieving this target, with an estimated contribution of over 70% to the national GDP. To realise the Viksit Bharat vision, around 20 such regions will need to deliver double-digit growth over the coming decades.

The Growth Hub (G-Hub) initiative, launched by NITI Aayog in 2023, is a strategic step in this direction. It seeks to unlock the potential of urban economic clusters through outcome-driven regional master planning. Four city-regions including Mumbai, Surat, Visakhapatnam, and Varanasi have been identified as testbeds to pilot and refine this model of high-growth regional transformation.

The Visakhapatnam Economic Region (VER) is one such region. Spanning nine coastal districts of Andhra Pradesh, it accounts for nearly a third of the state's GDP and population. With over 520 kilometres of contiguous coastline, a robust port network, one of the country's largest industrial land banks, some of India's most promising urban corridors, and a fast-growing digital ecosystem, VER is uniquely positioned to serve as Andhra Pradesh's growth fulcrum and emerge as one of India's most economically productive regions.

This Economic Master Plan charts an ambitious yet execution-ready pathway to transform VER into a $125-135 billion economy by 2032, while generating 2-2.4 million additional jobs and attracting $100-115 billion in investment. The plan is to build on this to make VER a $750-800 billion economy by 2047. The plan prioritises 49 high-impact projects across 7 growth sectors, including manufacturing, digital and IT services, agriculture, tourism, care economy, infrastructure and urbanisation, enabled by 9 policy unlocks and 8 institutional reforms across key agencies such as VMRDA, APIIC, APEDB, and APMB.

What makes VER particularly compelling is not just the strength of its physical and economic assets, but the clarity of its institutional ambition. This blueprint is underpinned by a readily available landbank of 35,000-40,000 acres and a catalytic investment pipeline of $20-25 billion.

NITI Aayog is proud to have supported the conception of this master plan. I would like to thank the Government of Andhra Pradesh and its officials for their support. I would also like to thank our knowledge partner, the Institute for Sustainability, Employment and Growth (ISEG) Foundation, for developing a replicable framework for Economic Master Planning of city-regions and aiding in the preparation of this Master Plan.

We look forward to continued collaboration with the Government of Andhra Pradesh to bring this vision to life and to show how a single region, through clarity of purpose and effective execution, can drive not only growth but true transformation.

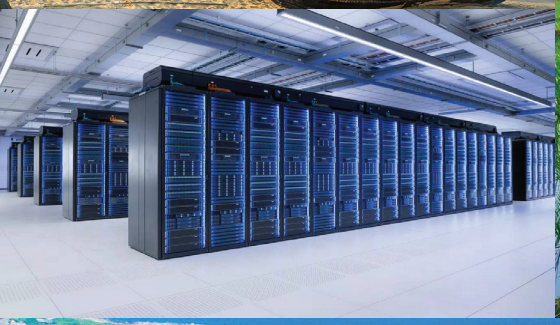
10/11

Dated: 10th November, 2025

[B.V.R. Subrahmanyam]

स्वच्छ भारत
एक कदम स्वच्छता की ओर



1 Executive summary




- The Visakhapatnam Economic Region (VER) is a $52 billion economy comprising nine districts: Visakhapatnam, Vizianagaram, Srikakulam, Anakapalli, Kakinada, East Godavari, Dr. B.R. Ambedkar Konaseema, Alluri Sitharama Raju (ASR), and Parvathipuram Manyam

- With a population of 16.5 million, based on FY24 estimates, VER recorded a per capita GDP of $3,170 (nearly 20% above the national average), positioning VER as a vital economic corridor on India's eastern coast. However, economic growth between FY12-FY24 has been sluggish, averaging at 6.1% real CAGR (11% nominal), lower than the state's average of 6.4% real CAGR (11.6% nominal)

- In line with the Swarna Andhra vision and the growth hub aspirations set forth in this Economic Master Plan, VER should aim to become a $125-135 billion economy by FY32, growing at a 10% real CAGR (15% nominal), while delivering inclusive, sustainable, and high-quality growth:
  - It must be acknowledged that this is an ambitious target, as very few large economic regions globally have managed to sustain double digit, long-term real growth
  - To achieve this bold aspiration, VER needs to ignite multiple growth cylinders simultaneously. Several elements, including projects, policies and institutional shifts will need to align parallelly, while drawing talent to the region and attracting $100-115 billion in investments

- To achieve this aspiration, the Economic Master Plan identifies 7 growth drivers, with the potential to unlock an incremental GVA of $60-70 billion and create 2-2.4 million new jobs by FY32. These are:

  1. **Global port-proximate manufacturing hub: (GVA increase: $25-30 billion; Job creation: 600,000-700,000)**

     Transform VER into a global port proximate manufacturing hub by:
     - Becoming national-best in 4 flagship sectors where VER has existing presence including: 1) steel and downstream steel 2) petrochemicals, chemicals and gas 3) ports and logistics and 4) pharmaceuticals and medical technology
     - Diversifying into 6 emerging sub-sectors of strategic importance including: 1) clean technology manufacturing 2) shipbuilding, ship-repair and ancillary manufacturing 3) defence (naval) manufacturing 4) electronics and electronic components 5) labour-intensive manufacturing and 6) alumina, aluminum and titanium dioxide

  2. **Next-gen IT, data centre, AI and innovation hub: (GVA increase: $8-10 billion; Job creation: 400,000-425,000)**

     Become India's emerging destination of choice for IT, data centre, AI, GCC and startup establishments by:
     - Emerging as an economically attractive destination of choice for new IT and

BPM setups

- Becoming one of the top 3 data centre and AI hubs in India hosting at least 2-2.5 GW of data centre capacity and a cable landing station by FY32
- Emerging destination of choice for the startup ecosystem with over 5,000 registered startups by FY32
- Evolving into a GCC hub with 60-80 domain specific centres across areas such as pharmaceuticals, ag-tech, ports, and shipbuilding

3. **Global agriculture leader: (GVA increase: $5-7 billion; Job creation: 100,000 -125,000)**

Consolidate and elevate VER's position as an agricultural leader with clearly defined targets for production, export, and processing across four key value chains:

- Retaining national and international leadership in egg production by increasing produce from 13-14 billion to 25-30 billion eggs by FY32
- Tripling aquaculture output from 0.6 to 1.5-2 MMTPA while increasing VER's share of AP's capture from 50-55% to 75% by FY32 to maintain national leadership in fisheries across both volume and value
- Doubling GVA from $1.5 to $3 billion by FY32 across 5 crops (coffee, oil palm, banana, cashew and coconut) which account for 65% of VER's area under horticulture
- Solidifying East Godavari's position as the nursery capital of India, with an expanded focus on global exports

4. **Renowned tourism attraction: (GVA increase: $4.5-5.5 billion; Job creation: 300,000-350,000)**

Transforming VER into a renowned tourism hub, aspiring to increase foreign and high-spending tourists from 30,000-40,000 currently to 1.5 million by FY32 by developing multiple destinations across 4 prioritised themes including 1) coastal 2) MICE 3) religious and spiritual and 4) experiential tourism. Though ambitious, tourism can be a critical driver of economic growth for VER

5. **National and international healthcare hub: (GVA increase: $3-4 billion; Job creation: 100,000-150,000)**

Building on VER's current standing as a regional medical and skilling ecosystem to emerge as:

- An international healthcare hub of choice for the Telugu diaspora and ASEAN countries by establishing a 700-800 acres mixed-use healthcare campus with 15-20 hospitals, 5,000+ beds and dedicated elder-care and wellness zones
- A global skilling hub with 2 new medical and 10-12 new nursing colleges targeting export of 70,000-80,000 medical workers by FY32

6. **Planned urbanisation and housing: (GVA increase: $6-7 billion; Job creation (mainly construction): 200,000-300,000)**

   Transforming VER into a next-generation urban hub by transitioning from fragmented and unorganised development to creation of 15 globally benchmarked, master planned mixed-use clusters including at least 7 industrial cities, 6 services focused hubs and 2 brownfield cities. This will require creation of 1) 650,000-750,000 new housing units, including rehabilitation of nearly 130,000 slum households 2) cluster redevelopment of 6-8 dense localities in Visakhapatnam and 3) development of 10-12 transit-oriented nodes across planned stations

7. **Lighthouse of sustainability and best-in-class infrastructure: (GVA increase: $4-6 billion; Job creation (mainly construction): 300,000-350,000)**

   Transforming VER into a lighthouse of sustainability and infrastructure by:

   – Creating seamless road, rail and metro connectivity through 30 prioritised developments

   – Investing in sustainable infrastructure including 2-3 new CBG plants, 1 new waste-to-energy plant, enhanced water and sewage treatment infrastructure and 4,000 new electric/CNG buses

   – Upgrading power infrastructure to meet peak energy requirements with an ambition to meet half of the demand from renewable sources by FY32

- These growth drivers have been converted into 49 high-impact projects including 13 manufacturing, 6 IT, 5 agriculture, 9 tourism, 1 healthcare, 7 urbanisation and 8 infrastructure related projects. Select marquee projects are as detailed below:

  1. Establish 25 MMTPA steel, 12 MMTPA pellet and 2,000 acres downstream steel hub in Nakkapalli and Visakhapatnam
  2. Develop port capacity of 435 MMTPA across four existing and two new ports (Mulapeta, Kakinada Gateway), and create two 400 acres MMLPs in Anakapalli and Srikakulam
  3. Develop 1.5 MMTPA mixed-feed cracker and 2,000 acres downstream and specialty chemical hub in Srikakulam
  4. Establish a 0.5 million GT shipbuilding, ship-repair and ancillary cluster near Mulapeta
  5. Create 3 pharmaceutical parks: 3,000 acres life-sciences park (Srikakulam), 2,000 acres bulk drug park (Nakkapalli) and 500 acres MedTech zone (Anakapalli)
  6. Develop a 2,000 acres multi-product downstream clean-tech hub in Anakapalli, 0.5 MMTPA green hydrogen hub in Pudimadaka and 1 MMTPA green ammonia and 2 GW electrolyser manufacturing in Kakinada
  7. Create an IT and data centre hub at Anandapuram (300 acres), hosting Google's first AI hub in India, featuring a gigawatt-scale data centre campus in Tarluvada

8. Emerge as a major international subsea gateway by developing AP's first Cable Landing Station (CLS) in Visakhapatnam
9. Create 3 food-processing parks of 200 acres each (1 aquapark in Kakinada and 2 multi-product food processing parks in Vizianagaram and Anakapalli)
10. Create Vizag Bay City as a 40 sq. km coastal hub with 5 developed beachfronts, 2,000-2,500 additional room keys, 80-100 beach shacks, 50+ fine dining restaurants/ cafes, 8-10 beach clubs, a world-class adventure/theme park, a marina with 5-6 jetties, shopping complexes and a water sports hub
11. Create a world class, mixed-use international care hub near the upcoming airport featuring 5,000+ hospital beds across 15+ hospitals, a comprehensive skilling ecosystem with 2 medical and 10-12 nursing colleges, and a robust wellness and elderly care ecosystem (700-800 acres)
12. Master plan and develop Vizag Bay City and Vizag 2.0 as best-in-class brownfield urban cities
13. Redevelop 100% of the 130,000 slum households on GoI land by FY32
14. Expedite development of 5 ongoing and 7 new railway projects
15. Expedite development of 8 ongoing and 9 new road projects
16. Combine and complete development of phase 1 and 2 of the Visakhapatnam Metro (77 km) by 2030

- To enable timely execution of these interventions and unlock VER's full economic potential, fast-tracked action across the following five critical enablers will be essential:
    1. **Land:** 50,000-55,000 acres of land will be required for the implementation of this Economic Master Plan. Of this, 35,000-40,000 acres of land is already available with the central government, state government and its agencies. This readily available land bank offers a significant head start for anchor projects across industrial, services, and urban developments. Over 15,000 acres additional land needs to acquired or pooled
    2. **Investment attraction:** Financially, a total investment of $100-115 billion will be required to realise VER's vision by FY32, with nearly 85-90% expected from private sector investors (central PSUs included). Notably, $20-25 billion has already been committed across manufacturing, IT and data centres, infrastructure, and urban development. To kick-start the cycle of private capital mobilisation, accelerate infrastructure build-out, and unlock VER's full economic potential, catalytic government investment of $14-16 billion will be needed in the next 4-5 years, including $7-7.5 billion from the central government, $2-2.5 billion from state government, and $5-6 billion from other state government agencies such as VMRDA, APIIC, APMB, and APSHCL

3. **Policy unlocks:** To support these growth aspirations, VER will require creation of 6 launchpad sectoral/ sub-sector policies including: 1) focused land value capture/ land monetisation 2) shipbuilding and ship-repair 3) labour-intensive (toys and furniture) manufacturing 4) healthcare 5) operating guidelines/sub-sectoral policies for tourism and 6) slum rehabilitation and cluster redevelopment. Further, 3 existing policies will require amendments, including: 1) AP Innovation and Startup Policy 2) Andhra Pradesh State Aquaculture Development Authority Act and 3) The state support framework for seafood re-export
4. **Institutional shifts:** 8 key institutions will require significant strengthening to deliver on expanded mandates. These institutions are: 1) Visakhapatnam Metropolitan Region Development Authority 2) Andhra Pradesh Industrial Infrastructure Corporation 3) Andhra Pradesh Economic Development Board 4) Andhra Pradesh Maritime Board 5) Tourism Department/ Andhra Pradesh Tourism Development Corporation 6) IT, Electronics and Communications Department 7) Municipal Administration and Urban Development Department and 8) Greater Visakhapatnam Municipal Corporation. Additionally, a key institutional shift will be the creation of a unified Visakhapatnam Economic Region Authority under the chairmanship of the Hon'ble Chief Minister
5. **Support from the Government of India:** Focused unlocks from GoI will be pivotal to realise the full potential of VER. Key unlocks required include:
   - Fast-tracking approvals and sanction for proposed infrastructure projects including 7 new rail lines, 9 new roads, and phase 1 and 2 of the Visakhapatnam Metro
   - Assisting port and manufacturing expansions by unlocking Government of India land banks, including the salt pan land parcels in Srikakulam, and other unutilised land parcels with Government PSUs in Visakhapatnam
   - Enabling anchor investments in centrally coordinated industries such as petrochemicals and cracker units, shipbuilding and ship-repair, and defence manufacturing

- To ensure timely and coordinated execution of the VER Economic Master Plan, a robust implementation architecture should be established:
  1. Create a new unified Visakhapatnam Economic Region Authority chaired by the Hon'ble Chief Minister, supported by an Executive Committee:
     - The Authority should meet every quarter to take critical decisions and debottleneck projects as required
     - This should be supplemented by monthly Executive Committee meetings to facilitate inter-departmental coordination
     - An 8-10 member dedicated Program Monitoring Unit (PMU) should be housed

within the Visakhapatnam Metropolitan Region Developmental Authority (VMRDA). The PMU should be made responsible for conducting weekly reviews to maintain program momentum and provide timely issue resolution

2. Make senior secretary-level officers responsible for preparing and executing detailed action plans for each of the seven growth drivers
3. Ensure central coordination through NITI Aayog to address bottlenecks and ensure accountability across different central ministries and implementing agencies

2 Introducing the growth hub project

India is home to the second-largest urban population in the world, accounting for 11% of the global total (estimated to be 540 million). Although cities occupy only 3% of the country's land area, they house nearly 35-40% of the population and contribute a significant 60% to the national GDP.

Despite the significance of urban agglomerations, India's urban development has largely followed a pattern of reactive and fragmented planning, focusing narrowly on land use and infrastructure, often responding to immediate needs rather than long-term economic and employment goals. This approach has constrained the true economic potential of our urban regions and has weakened our ability to attract global capital and talent.

Globally, successful urban economic hubs were created on the backs of their capabilities to attract high quality talent. In fact, some of the world's largest urban economies, be it Singapore, London, Tokyo or New York, are also the world's best places to live and work.

As India sets its sights on the Viksit Bharat aspiration of becoming a $30 trillion economy by 2047, it is imperative to unlock the true economic potential of our city-regions. Towards this end, two paradigm shifts are essential. First, each urban region must be guided by a long-term economic vision, anchored through focused and implementable 10-year and 20-year Economic Master Plans. Second, the planning must shift beyond municipal boundaries towards a comprehensive city-region planning approach that covers all areas of economic relevance. As 70% of the urban infrastructure needed by 2047 is yet to be built, planning city-regions with a focus on economic development and job creation will be vital at this stage.

The 'growth hub' initiative was conceptualised to place economic and employment strategies at the core of urban and regional planning. Instead of reacting to growth, it promotes a proactive, region-first approach with a focus on sustainability, liveability, and long-term competitiveness. The initiative reimagines urbanisation, not as an issue confined to city limits, but as a city-region opportunity that integrates all spatially and economically interconnected zones.

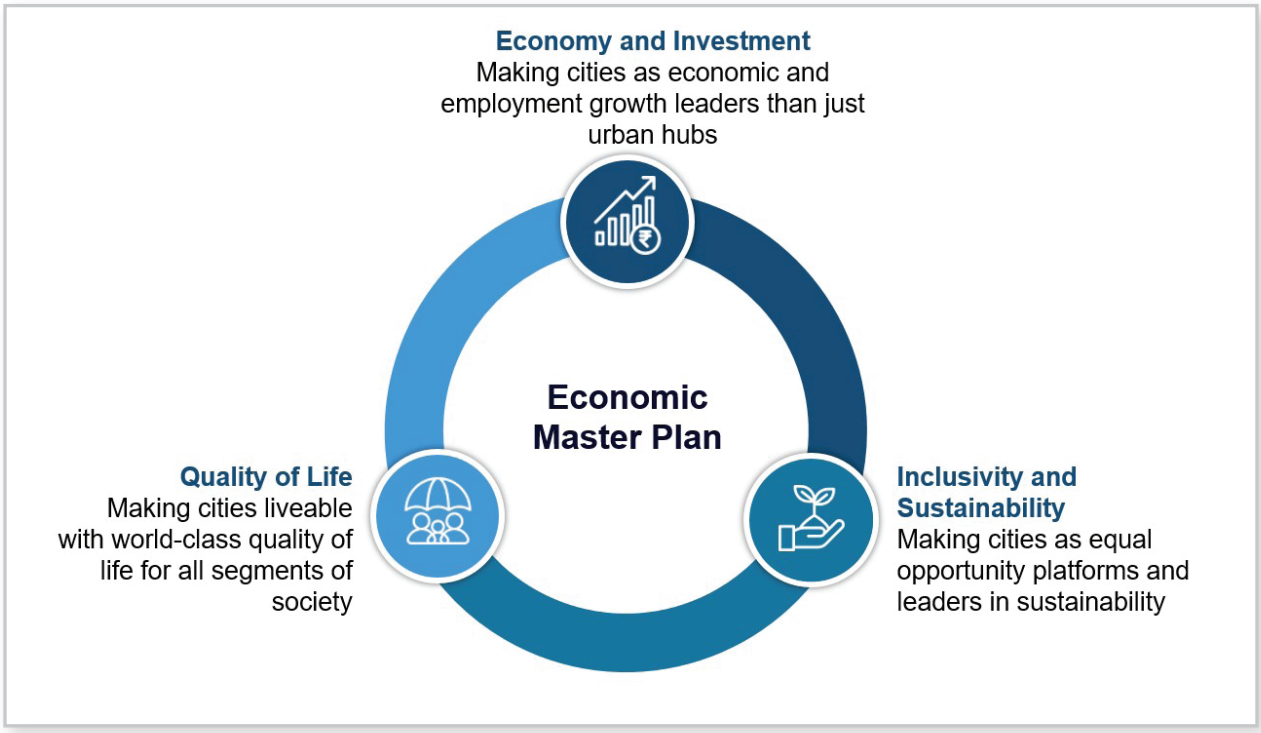
To lead this transformative effort, NITI Aayog, in consultation with the Government of Andhra Pradesh, prioritised the Visakhapatnam Economic Region (VER) as one of four pilot growth hub regions.

VER can aspire to become a $750-800 billion economy by FY47, and a $125-135 billion economy by FY32. We should note that realising this vision is not an easy target and will require substantial effort and investment from both public and private sector stakeholders.

To support economic growth of the region, several large-scale, intra- and inter-regional connectivity projects including road, rail, port and metro connectivity initiatives are under various stages of development. The Government of Andhra Pradesh has already articulated a bold vision to become a $420-430 billion economy by FY32 and a $2.4 trillion economy by 2047, and VER can play a central role in driving this growth.

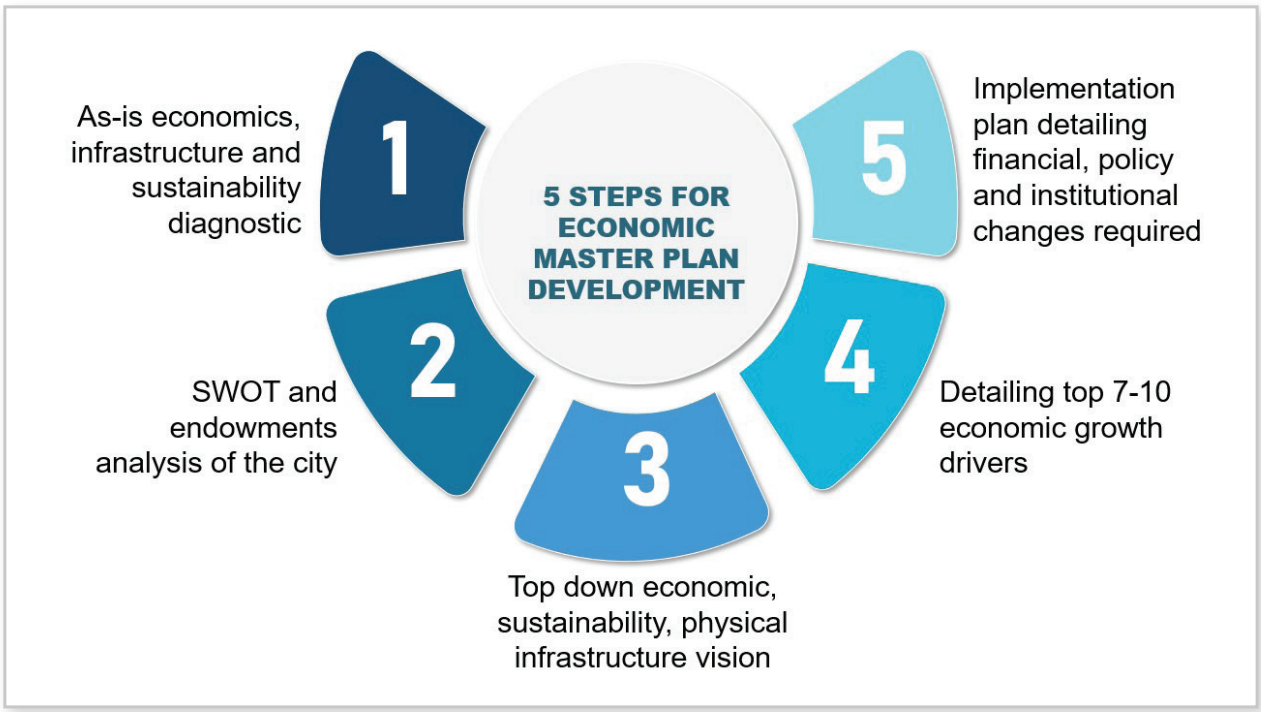
The Economic Master Plan for a city region should be founded on three key pillars, as shown in Figure 1.

Figure 1: Key elements of an Economic Master Plan



A five-step framework has been conceptualised for the Economic Master Planning of city regions, as shown in Figure 2.

Figure 2: 5 steps of Economic Master Planning



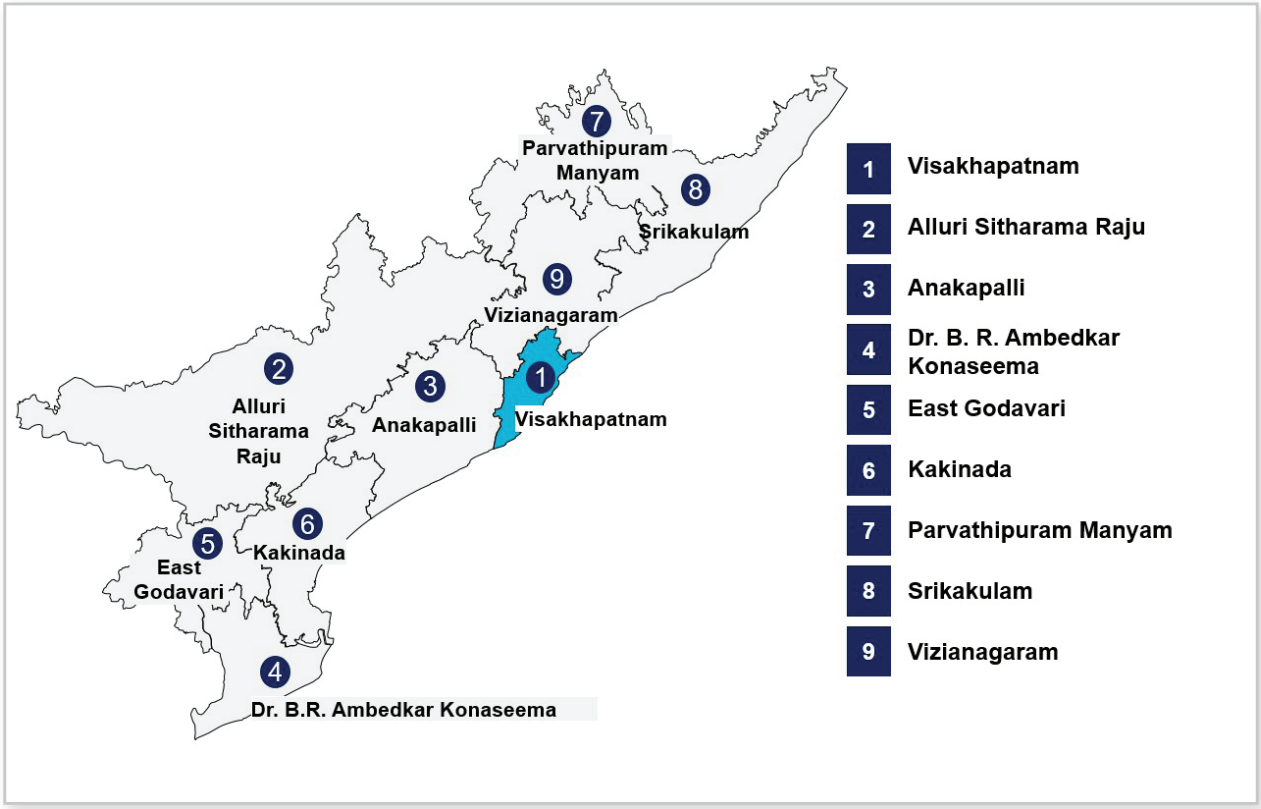
3 Providing context about the Visakhapatnam Economic Region

Determining the VER city-region

A framework for identifying the immediate economic catchment for the 'city-regions' was developed on the principles of contiguity, proximity, economic reliability, connectivity and complementarity.

Based on these parameters, as well as extensive consultations with the state government, VER was defined to include 9 districts as shown in Figure 3.

Figure 3: Defining the Visakhapatnam Economic Region



Key facts and figures for VER

Spread across nine districts in the northern part of Andhra Pradesh, commonly referred to as Uttarandhra, VER is strategically located along India's eastern coast. It spans nearly 38,000 square kilometres and is home to 16.5 million people (31% of AP's population as per FY24 estimates).[1]

Currently, about 35% of VER's population lives in urban areas, and is served by five municipal corporations: Greater Visakhapatnam Municipal Corporation (GVMC), Srikakulam Municipal Corporation, Vizianagaram Municipal Corporation, Kakinada Municipal Corporation, and Rajamahendravaram Municipal Corporation (East Godavari).

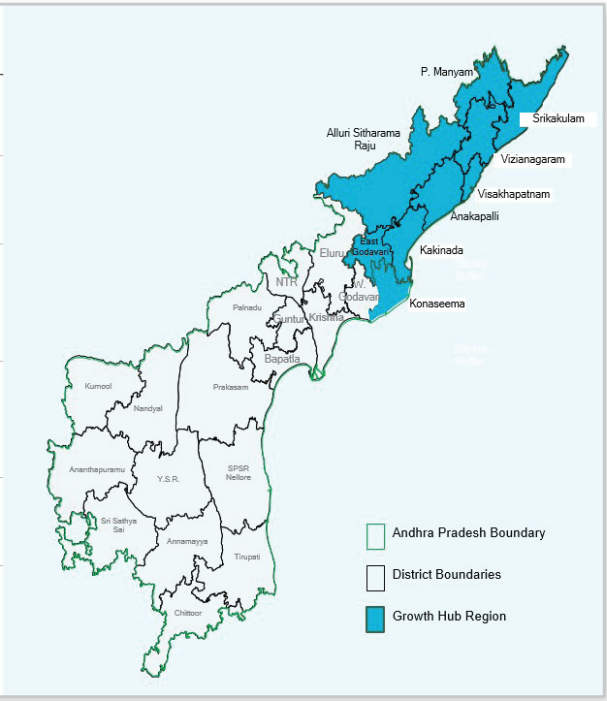
The remaining 65% of the population resides in rural areas. ASR and Parvathipuram Manyam are predominantly rural districts, with approximately 95% and 85% of their populations, respectively, living in rural areas.

In FY24, the region had an estimated GDP of $52 billion[2] (30% of AP) supported by a workforce of 7 million individuals.[3] Its per capita GDP of $3,170 is about 20% higher than the national average. A snapshot of the economic profile is provided in Figure 4.

Visakhapatnam district serves as the economic and urban nucleus of the region. With a per capita GDP of $6,600 (more than 2.5 times the national average), it ranks among the most productive urban hubs in the country. This strength is largely driven by its robust manufacturing sector, which constitutes 30-40% of the district's GDP.

Figure 4: Economic profile of VER

	AP	VER	Share of AP
Population 2024 (million)	53	16.5	31% of AP
Area (Sq. Km)	163,000	38,000	23% of AP
GDP (current prices, FY24, $ billion)	172	52	30% of AP
GDP per capita (current prices, FY24, $)	3,230	3,170	India's GDP per capita - $2,600
Workforce (FY24, million)	24	7	30% of AP
Labor Force Participation Age 15-59 years (FY24)	67%	63%	Lower than AP



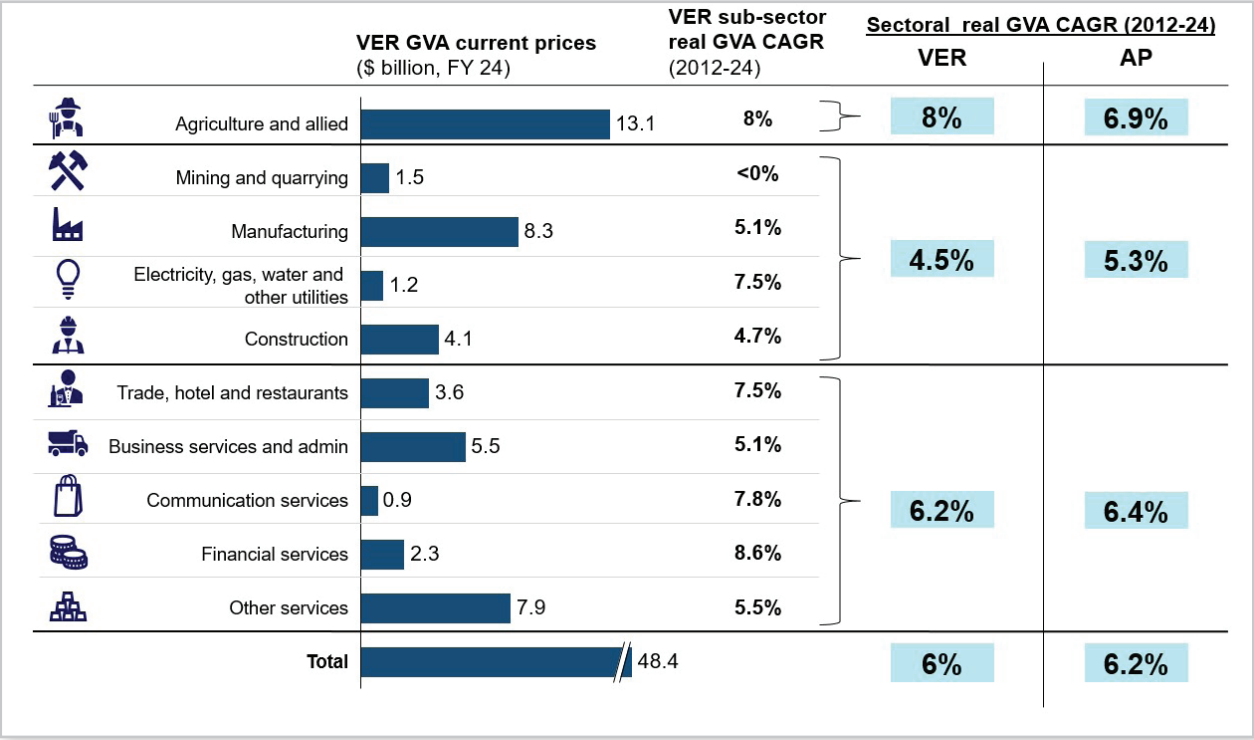
The region's GDP has grown at around 6.1% real CAGR between FY12-24 (11% nominal), slower than Andhra Pradesh's 6.4% CAGR over the same period.[2] The sectoral gross value addition is as follows:

- **Agriculture and allied sectors:** With its rich alluvial and deltaic soil across the Godavari delta region, and one of the highest proportions of irrigated farm land in India (50-55% of net sown area), VER is an agrarian powerhouse. Agriculture contributes 27% to the region's GVA. Consistently strong outputs from horticulture, aquaculture, and livestock, have made VER a leader in both volume and value of produce. With an 8% real CAGR (FY12-24), agriculture has been the fastest growing sector for the region
- **Industries and mining:** VER is home to a robust base of industries, including iron and steel, chemicals, textiles, pharmaceuticals and shipbuilding. The region was once

the state's major industrial belt, contributing nearly 50% of Andhra Pradesh's industrial GVA. However, the mining and industrial sector, which currently accounts for 37% of VER's GVA, has grown at a modest 4.5% real CAGR between FY12-FY24. During the same period, GVA at the state level for these sectors grew at 5.3%

- **Services:** The service sector, including trade, transport, professional services, and education, accounts for nearly 42% of the region's GVA and has expanded at an average real CAGR of 6.2%. With the new international airport slated to commence operations in 2026, and with Visakhapatnam gaining recognition as a preferred destination for IT, technology, and data centre establishments, the sector has untapped potential and considerable scope for growth in the coming years

Figure 5: Sectoral break up of VER's GVA



Overview of VER districts

VER comprises 9 districts. A brief overview of these districts is as detailed below:

1. Visakhapatnam: (FY24 estimates: $13.9 billion GDDP, 2.1 million population)

Visakhapatnam stands tall as the economic capital of Andhra Pradesh. Anchored by India's oldest shipyard and the Eastern Naval Command, it hosts two deepwater ports and a thriving industrial ecosystem. Its scenic coastline, featuring multiple pristine beaches flanked by green hills, draws visitors each year, while its fast-growing IT, healthcare, and tourism sectors are propelling it onto the national stage as one of India's most future-ready urban powerhouses

2. **Anakapalli: (FY24 estimates: $6.2 billion GDDP, 1.9 million population)**

Anakapalli is emerging as one of India's fastest-growing industrial corridors. Anchored by a strong chemical and pharmaceutical base, it is home to over 10,000 MSMEs and multiple SEZs. With committed investments, the district is set to host one of India's largest integrated steel plants and a 0.5 MMTPA green hydrogen hub. Its strategic connectivity to Visakhapatnam, combined with the availability of best-in-class talent, positions it as a critical hotspot for VER's industrial growth

3. **Alluri Sitharama Raju: (FY24 estimates: $2.1 billion GDDP, 1 million population)**

Named after the legendary freedom fighter, ASR district is a pristine region where dense forests cover over 70% of the land. It's home to the world-renowned Araku Coffee, India's first tribal coffee brand, celebrated for its organic, chemical-free cultivation, GIS certification and global exports. Beyond its exceptional coffee, ASR is a premier eco, tribal and cultural tourism destination, with Araku, Lambasingi and Borra caves emerging as iconic drawcards for tourists worldwide

4. **East Godavari: (FY24 estimates: $6.8 billion GDDP, 2 million population)**

Blending economic vitality with deep spiritual roots, East Godavari district is the egg and nursery capital of India. Rajamahendravaram's robust economy and airport support this dynamism. Culturally, the district is enriched by the ancient Draksharama temple, and is a major pilgrimage destination during the Godavari Pushkaram, centred on its life-giving river

5. **Kakinada: (FY24 estimates: $7.4 billion GDDP, 2.2 million population)**

Where fertility meets industry, Kakinada is one of VER's most balanced economic districts. A leading paddy-producing region, it is also the fisheries capital of VER, supported by strong shrimp and marine exports. The district additionally hosts large-scale industries in oil and gas, pharmaceuticals, and agro-processing. With multiple ports handling substantial cargo, Kakinada serves as a critical logistics and export gateway, acting as the state's maritime link to the Krishna-Godavari (KG) Basin

6. **Dr. B. R. Ambedkar Konaseema: (FY24 estimates: $5.1 billion GDDP, 1.8 million population)**

Part of the Godavari deltaic region, Konaseema is an agrarian leader across paddy, coconut, other horticulture crops and is home to a thriving aquaculture economy. Its shallow tidal waters offer untapped potential for seaweed cultivation, positioning the district as a strong contender in India's emerging blue economy. Its lush green backwaters, white sand beaches, and scenic landscapes have also made it a preferred destination for the Tollywood film industry

7. **Srikakulam: (FY24 estimates: $4.5 billion GDDP, 2.4 million population)**

Srikakulam, Andhra Pradesh's northern gateway, is rapidly transitioning into a future industrial powerhouse. In addition to expanding its pharmaceutical manufacturing

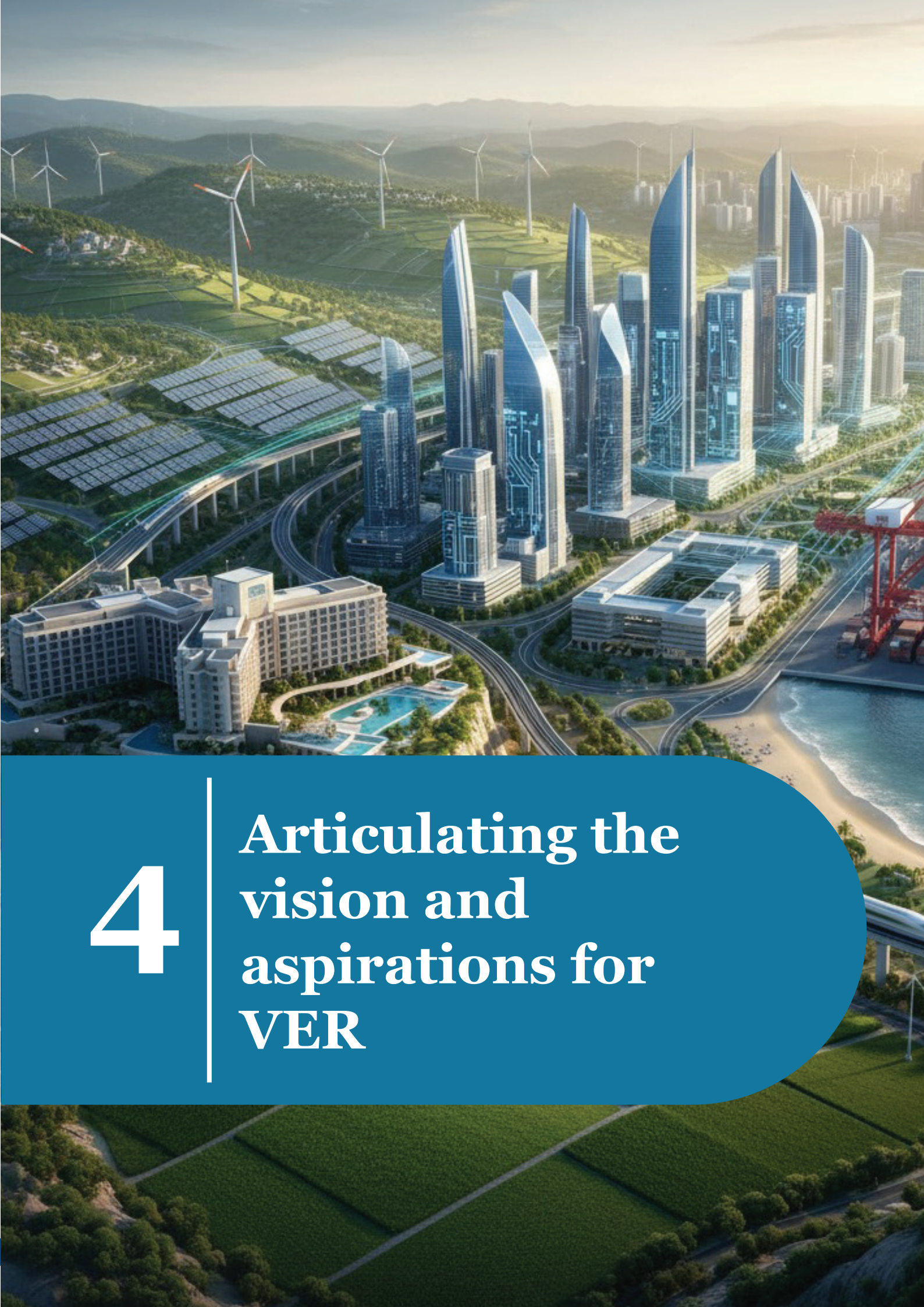
base and hosting the prominent Palasa cashew cluster, the district's growth trajectory will be shaped by the upcoming Mulapeta Port. Poised for immense capacity by FY32, this port is expected to transform Srikakulam into a mega industrial and logistics hub, driving unprecedented growth across northern Andhra Pradesh

8. Parvathipuram Manyam: (FY24 estimates: $1.9 billion GDDP, 1 million population)

Manyam, is primarily an agricultural district, deeply rooted in its rural and tribal heritage. The district is pursuing economic development through millet-based value chains, poultry, tribal tourism, and livelihood-focused skilling programmes, aiming to harness its natural endowments, scenic beauty and human resources for future prosperity

9. Vizianagaram: (FY24 estimates: $4.3 billion GDDP, 2.1 million population)

Vizianagaram district, steeped in a rich history including the famed Bobbili Yuddham, is strategically evolving as a significant logistics and services extension to Visakhapatnam. In addition to its strong agricultural roots and some manufacturing presence, the district is rapidly expanding in education, food processing, and urban housing. The under development Bhogapuram International Airport and Aerocity, located 50-60 kilometres from Visakhapatnam, is expected to position the district as a major regional hub for service-sector growth, spanning trade, tourism, and IT



4 Articulating the vision and aspirations for VER

Overall, VER is at a pivotal moment and is poised for significant transformation. Currently, it boasts a GDP of $52 billion, and contributes nearly 30% of Andhra Pradesh's GDP through its strong industrial and agricultural sectors.

Looking ahead to 2047, VER has an ambitious goal of becoming a $750-800 billion economy, with a per capita GDP of $42,000-44,000 (comparable to present-day Tokyo or Melbourne). The aspiration for VER is to retain nearly a third of the state's share, which is envisioning to become a $2.4 trillion economy by the centenary of India's independence.

VER's population, estimated at 16.5 million in FY24[1], is projected to reach 17-18 million by FY32[3]. The increase in inter- and intra-state migration due to the economic and employment opportunities envisioned in this master plan, are expected to fuel this growth.

To turn this Economic Master Plan into reality, the vision has been broken down into a seven-year, execution-ready roadmap till FY32.

VER is targeting to emerge as a massive $125-135 billion economy by FY32, growing at a robust 10% real CAGR and achieving a per capita GDP of $7,400. This ambitious growth will be powered by the seven growth drivers prioritised in this Economic Master Plan, which are expected to generate $60–$70 billion in incremental GVA and create 2–2.4 million additional jobs by FY32.

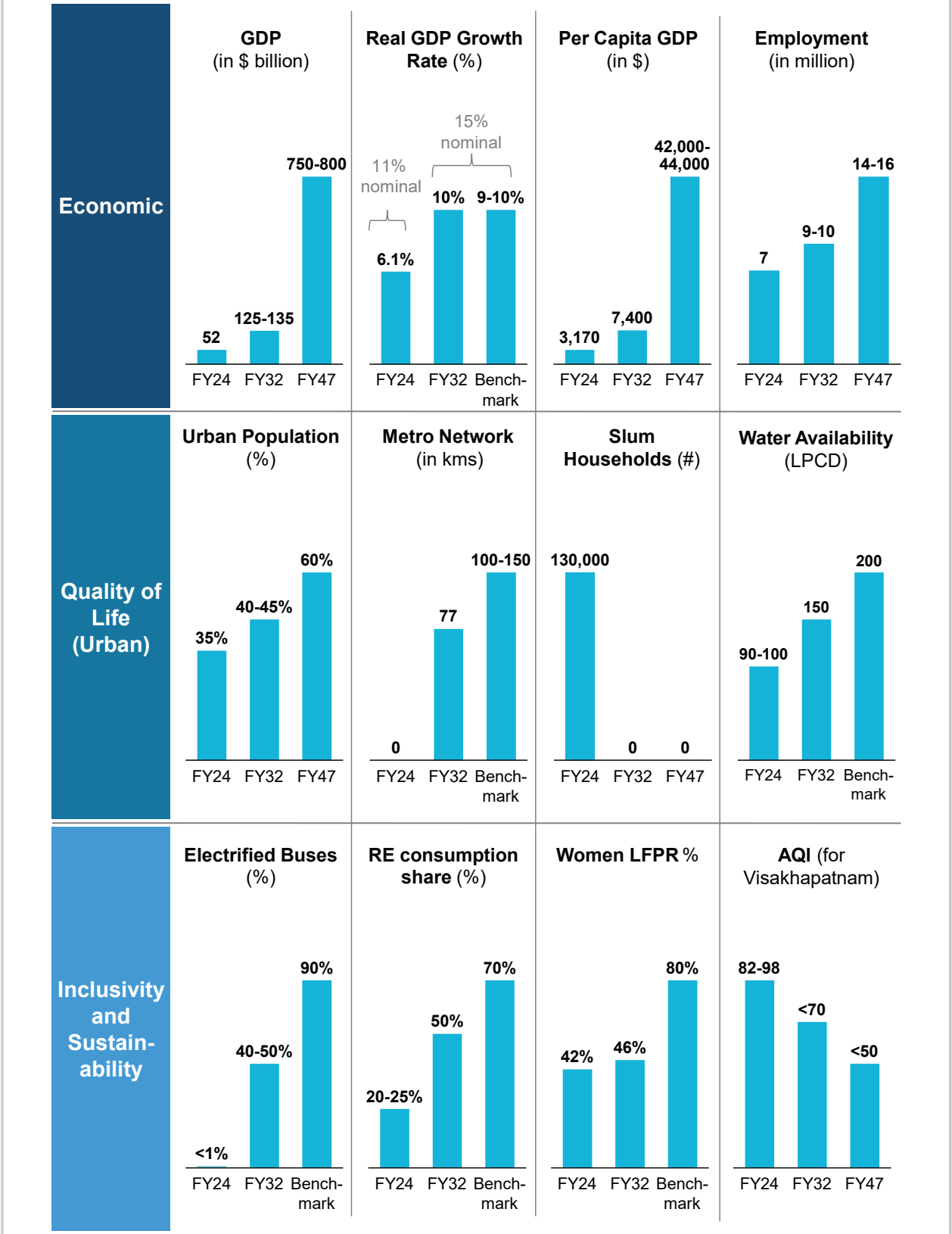
Figure 6: Economic profile of VER and AP

		FY24	FY32 Aspiration	FY47 Aspiration
VER	GDP	$52 billion	$125-135 billion (10% real, 15% nominal CAGR)	$750-800 billion (10% real, 15% nominal CAGR)
	Per Capita GDP	$3,170	$7,400	$42,000-$44,000
	Employment	7 million	9-10 million	14-16 million
AP	GDP	$172 billion	$420-$430 billion (10% real, 15% nominal CAGR)	$2.4 trillion (10% real, 15% nominal CAGR)
	Per Capita GDP	$3,230	$7,700	$42,000

Certain key implications of VER's growth that are important to note, include:

- By FY32, 2-2.4 million additional jobs are expected to be created in VER. To effectively meet this demand, the region must transform into a talent attraction magnet (such as Hyderabad and Bengaluru) and attract 0.5-1 million skilled individuals from other districts/ regions to fuel this economic growth. Given the demographic uptake, ensuring outward growth beyond Visakhapatnam will be critical to ensure sustainable development
- The per capita GDP aspiration will require at least 30-40% of all new jobs (i.e. 600,000-800,000 jobs) in VER to be cutting-edge roles across high value-adding areas such as IT/ITeS, AI, skill-based manufacturing and R&D
- Simultaneously, VER has set ambitious goals to become a liveability, inclusivity and sustainability leader (Figure 7), akin to global economic hubs such as Singapore, London, and Tokyo. The urban population is projected to be 40-45% by FY32 and 60% by FY47 as compared to the current 35%. To manage this demographic shift, the vision has set clear urban development targets such as:
    1. **Metro network:** The planned metro network for Visakhapatnam (Phases 1 and 2) will be 77 km and is expected to be completed by 2028-30. By comparison, global benchmarks for metro coverage (measured in km per lakh population) suggest that a 150+ km network would be appropriate for a city of this size
    2. **Slum households:** VER is estimated to have around 130,000 slum households (9% of total urban houses). These are largely concentrated on land owned by GoI entities such as the railways and defence authorities. A new slum rehabilitation policy should be formulated by leveraging the GoI's 'Housing for All' scheme, targeting 100% slum rehabilitation by FY32
    3. **Water availability:** Urban water availability should be increased from the current 90-100 LPCD to 150 LPCD by FY32, in line with global benchmarks such as London and Tokyo, as well as standards prescribed by Ministry of Housing and Urban Affairs (MoHUA), GoI
    4. **Renewable energy:** The share of renewable energy in total consumption can be increased from 20-25% in FY24 to 50% by FY32, guided by the state's least-cost renewable energy transition vision

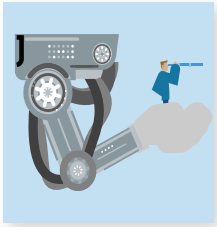
Figure 7: VER's aspirations on quality-of-life indicators



5 Growth drivers that will transform VER into an economic hub

VER has 7 legacy endowments that can be built upon to achieve the region's economic and employment aspirations as shown in Figure 8.

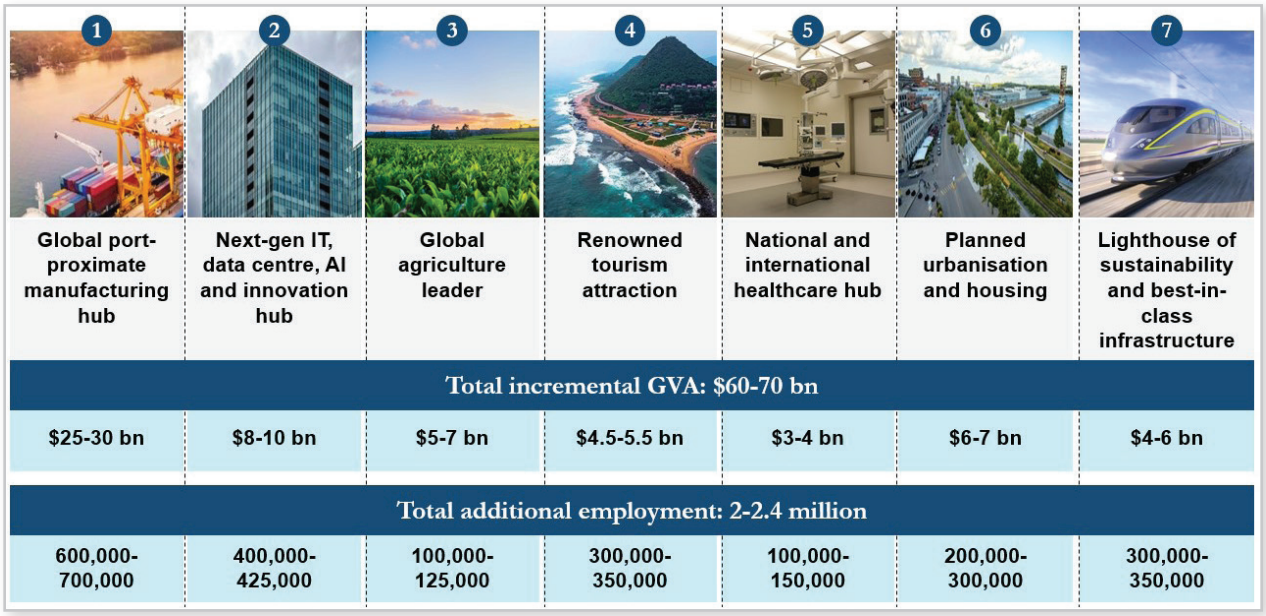
Figure 8: 7 legacy endowments of VER

	1	**Robust manufacturing ecosystem**	A strong manufacturing base, contributing over 35% to the state's manufacturing GVA, with significant presence in steel, chemicals, and shipbuilding industries
	2	**Strong port and logistics ecosystem**	With a port capacity of 228 MMTPA, VER handles 8-10% of India's cargo through one major port, and 3 additional ports in the region
	3	**Leading pharma and medical technology clusters**	Contributing 7-8% to India's sectoral GVA, VER is a leading pharma cluster. Early development of plug-and-play ecosystem including 2,400 acres pharma-city and 500 acres medtech zone have been key drivers
	4	**Strong cultural and natural tourism base**	A 520-km coastline with recreation activities, supported by over 50 religious sites and temples, 5 wildlife sanctuaries, multiple pristine beaches and an international cruise terminal
	5	**Affordable regional healthcare hub**	An integrated healthcare ecosystem in Arilova featuring 35 hospitals and 1,500 beds, serving as an affordable regional medical hub for AP and neighbouring states
	6	**Robust IT and innovation destination**	Home to over 250 technology and BPM firms, employing over 50,000 professionals, supported by cost-effective Grade A offices, skilled talent pool, and strong government support
	7	**National leader in agriculture-allied sectors**	A leading producer of eggs, fish and shrimp, and horticulture produce such as palm oil, coffee, cashew, banana, and coconut

Based on the region's endowments, favourable trends in the global economy and growth aspirations of the state, 7 strategic growth drivers have been identified to fuel VER's sustainable and inclusive economic transformation by FY32.

Together, these seven drivers have the potential to transform VER into a $125-135 billion economy by FY32, generating approximately 2-2.4 million additional jobs. This ambitious projection underscores the region's capacity for substantial economic expansion, anchored in strategic initiatives across multiple sectors, as illustrated in Figure 9.

Figure 9: Seven key growth drivers prioritised in this Economic Master Plan



1	2	3	4	5	6	7
Global port-proximate manufacturing hub	Next-gen IT, data centre, AI and innovation hub	Global agriculture leader	Renowned tourism attraction	National and international healthcare hub	Planned urbanisation and housing	Lighthouse of sustainability and best-in-class infrastructure
Total incremental GVA: $60-70 bn						
$25-30 bn	$8-10 bn	$5-7 bn	$4.5-5.5 bn	$3-4 bn	$6-7 bn	$4-6 bn
Total additional employment: 2-2.4 million						
600,000-700,000	400,000-425,000	100,000-125,000	300,000-350,000	100,000-150,000	200,000-300,000	300,000-350,000

Growth Driver 1

Global port-proximate manufacturing hub

Context

In FY23, India recorded a manufacturing GVA of over $450 billion. The top three states contributing to India's manufacturing GVA were Gujarat (17.5%), Maharashtra (13%), and Tamil Nadu (11%). These states benefit from robust port ecosystems, collectively handling 60-65% of the country's port cargo, with Gujarat accounting for 38-39%, Maharashtra 15-16%, and Tamil Nadu 9-10%.

Although Andhra Pradesh ranked third among Indian states in terms of port cargo handled (12-13% share), it contributed only 4-5% to the country's manufacturing GVA, placing it ninth in the manufacturing sector rankings. The state has set an aspiration to increase its share of India's manufacturing GVA to over 5% by 2029 and over 7% by 2047.

VER plays a critical role in India's port sector, managing 8-10% of the country's cargo through one major and three non-major ports. With a $8.3 billion GVA from manufacturing in FY24, VER accounts for a major share of the state's manufacturing GVA (over 35%). With a favourable convergence of maritime and industrial legacy, VER is uniquely positioned to become one of India's leading port-proximate manufacturing engines of growth. However, VER's manufacturing sector has grown at a laggard pace of only 5.1% real growth between FY12-24.

While myriad sub-sectors contribute to VER's manufacturing economy, this Economic Master Plan places focused attention on reviving the sector by enabling transformative development of 10 priority manufacturing sub-sectors. These sub-sectors have been classified into two archetypes, 'Flagship Sectors' and 'Emerging Sectors', based on VER's existing endowments, industrial presence, national and global economic trends, and potential for dynamic and inclusive growth.

Among the 10 priority sectors, four have been designated as 'Flagship sectors', areas with inherent strengths that can position VER as a national leader in port-proximate manufacturing. These include: 1) steel and downstream steel 2) petrochemicals, chemicals, and natural gas 3) pharmaceuticals and medical technology and 4) ports and logistics. These sub-sectors are underpinned by a robust foundation of existing assets and endowments including:

- A 7.3 MMTPA steel plant in Visakhapatnam
- A 15 MMTPA oil refinery in Visakhapatnam
- One of India's top five pharmaceutical and medical technology clusters
- Multiple chemical manufacturing units
- Four operational ports with a combined capacity of 228 MMTPA

Further, 6 'Emerging Sectors' where VER can establish meaningful presence include: 1) clean technology manufacturing 2) shipbuilding, ship-repair and ancillary manufacturing 3) defence (naval) manufacturing 4) electronics and electronic components manufacturing

5) select labour-intensive industries and 6) alumina, aluminum and titanium dioxide. Though these sectors currently make only a limited contribution to VER's economy, they can leverage the region's unique advantages, such as proximity to the Eastern Naval Command, presence of the HSL shipyard, committed clean-tech investments like NTPC's 0.5-MMTPA green hydrogen hub, and the availability of raw material and high-quality infrastructure, to emerge as pioneers of focused, catalytic, and inclusive industry-led growth.

Driving these sectors forward will be integral to building a comprehensive and diverse manufacturing ecosystem in the region.

Aspiration for VER

VER can emerge as a global port-proximate manufacturing powerhouse, anchored on four 'Flagship Sectors' and six 'Emerging Sectors', with the potential to add $25-30 billion in incremental GVA and create 600,000-700,000 new jobs by FY32. This will require investments of $55-60 billion, of which 90-95% will need to be attracted from the private sector (including central PSUs). Figure 10 lists out the ten prioritised manufacturing sub-sectors with their potential impact on GVA and jobs.

Figure 10: Aspiration across the 10 prioritised manufacturing sub-sectors

		Sectors	Sectoral GVA (In $Billion) Current	Incremental (FY32)	FY32A	Incremental Jobs, FY32
4 Flagship	1	Steel and downstream steel	2-2.5	7.5-8	9.5-10.5	110,000 - 130,000
	2	Petrochemicals, chemicals and gas	0.5	4-4.5	4.5-5	65,000 - 75,000
	3	Ports and logistics	2-3	2.5-3	4.5-6	50,000 - 60,000
	4	Pharmaceuticals and medical technology	1.5	5-6	6.5-7.5	90,000 - 110,000
6 Emerging	5	Clean technology manufacturing	0.1	2-2.5	2.1-2.6	60,000 - 70,000
	6	Shipbuilding, ship-repair and ancillary manufacturing	0.1	1.4-1.6	1.5-1.7	60,000 - 70,000
	7	Defence (naval) manufacturing	-	0.2-0.5	0.2-0.5	15,000 - 20,000
	8	Electronics and electronic components	-	1.5-2	1.5-2	60,000 - 65,000
	9	Labour intensive manufacturing	0.1	0.2-0.3	0.3-0.4	40,000 - 45,000
	10	Alumina, aluminum and titanium dioxide	-	0.6-1.2	0.6-1.2	50,000 - 55,000
		Total		Delta GVA: 25-30 Billion		600,000-700,000

Note: Current projections include logistics GVA for ports and are thus higher than VER's manufacturing GVA number; Emerging sectors have negligible GVA and have been assumed as $0/0.1billion

Proposed interventions to achieve VER's aspiration

This section provides a deep-dive into each of the manufacturing sub-sectors, highlighting VER's vision, aspiration, and proposed interventions to emerge as a global port-proximate manufacturing hub by FY32.

1. Flagship sector: Steel and downstream steel

Aspiration for VER

VER should emerge as one of India's top 3 steel and downstream steel hubs by establishing 25 MMTPA of steel capacity, 12 MMTPA of pelletisation capacity, and a 2,000 acres downstream steel complex. This is projected to deliver a GVA increase of $7.5-8 billion and generate nearly 110,000-130,000 new jobs by FY32. Realising this vision will require total investments of $13-14 billion, including $12.5-13.5 billion private sector infusion.

Context

India is the world's second largest producer of steel, producing 140-145 MMTPA of crude steel, with a total installed capacity of 175-180 MMTPA.[4]

Given India's low per capita steel consumption of 95-105 kg (vs. global average of 210-220 kg), domestic steel demand is projected to double from 130-140 MMTPA to 240-260 MMTPA by 2035. This growth will be primarily driven by large-scale infrastructure projects, rising per capita incomes, and increasing pace of urbanisation.[5]

Currently, VER has a steel production capacity of 7-8 MMTPA, comprising RINL's 7.3 MMTPA steel plant in Visakhapatnam and 2-3 smaller producers in the Visakhapatnam-Vizianagaram belt. Additionally, the region also has 8 MMTPA of pelletisation capacity in Visakhapatnam.

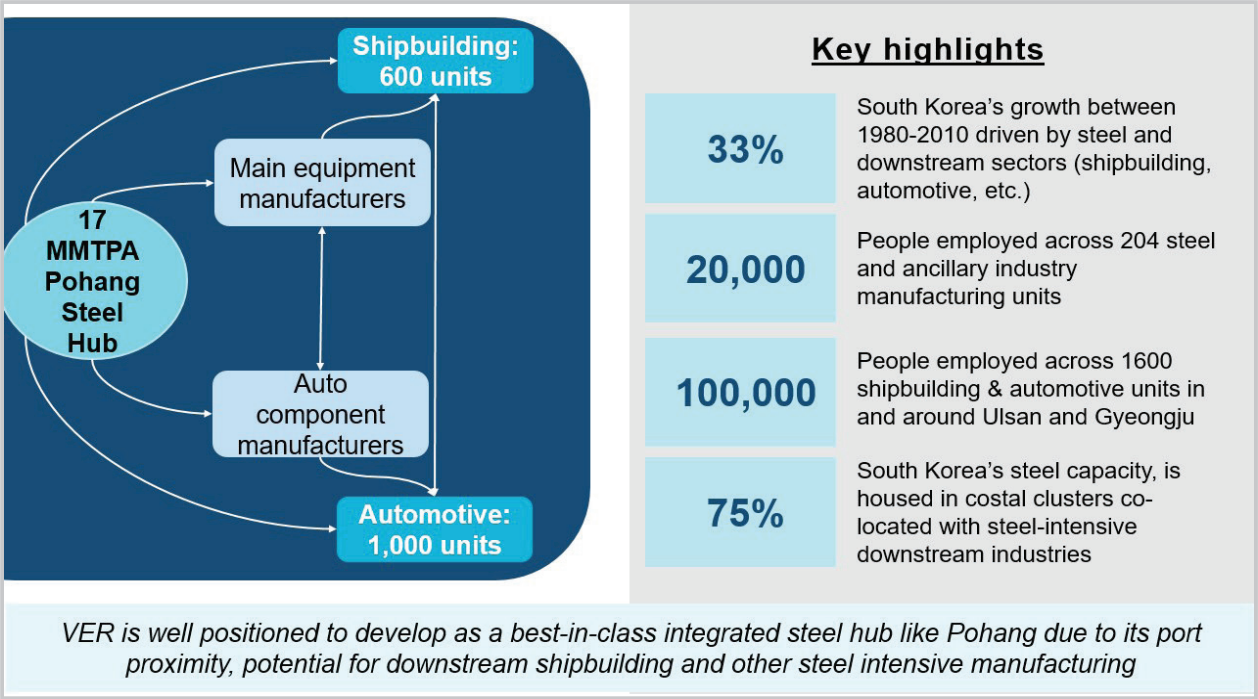
However, VER's steel sector faces two key challenges. First, a majority of VER's steel output is in the form of long steel (used primarily in construction and infrastructure projects) which has a relatively limited downstream value addition when compared to flat steel (used extensively in the automobile, white goods, equipment and metal goods industries). Second, the RINL plant is significantly under-utilised, producing 4.5 MMTPA of steel in 2024, operating at 60-65% of its capacity, far below the national average utilisation of 80-85%.[6]

Proposed interventions to achieve VER's aspiration

VER can leverage its strong steel endowments and emerge as one of India's top 3 steel hubs with 25 MMTPA steel, and 12 MMTPA of pelletisation capacity by FY32.

For instance, South Korea's 17 MMTPA coastal steel cluster in Pohang, which makes up nearly a quarter of the country's steel production capacity today, spurred growth in proximate downstream industries (such as automotive, shipbuilding, fabrication, and machinery) between 1980-2010 as highlighted in Figure 11.[7] Collectively, the country's steel and related downstream industries contributed around 33% to its economic growth in the same timeframe.

Figure 11: Highlights of the Pohang steel cluster in South Korea



Similarly, VER is well positioned to develop a best-in-class integrated steel hub with potential for downstream steel industries (such as shipbuilding and defence) and steel intensive manufacturing. The good news is that many of the elements required to enable this transformation are already in place. Building on these foundations, the following interventions will be critical to drive this transformation by FY32:

1. **One of India's largest greenfield integrated steel plants:** ArcelorMittal Nippon Steel, a private sector player has kick-started development of one of India's largest integrated steel plants in Nakkapalli, targeting operationalisation of 7 MMTPA by 2029 (phase-1) and 14-15 MMTPA by 2032 (phase-2), with the potential to reach 17-19 MMTPA by 2034-35. With 2,200 acres of land already allocated for phase-1 of this project, significant tailwinds are expected towards the production of primary steel. The plant is expected to produce flat steel with high downstream value addition potential. The integrated steel plant will require private investments in the range of $10-11 billion by FY32-34
2. **New iron ore slurry pipeline and a dedicated captive port:** The integrated steel plant at Nakkapalli will be supported by a new iron ore slurry pipeline from Kirandul-Bailadila and a dedicated captive port with 20-25 MMTPA of cargo capacity. This will require investments of around $350-450 million in the region. The slurry pipeline and captive port are expected to make this steel complex highly competitive (in the top quartile of the cost curve). One key enabler required is for the National Mineral Development Corporation (NMDC) to increase its iron ore production capacity at Bailadila mines from 35-40 to 80-100 MMTPA by 2032, to support the long-term growth of this steel complex

3. **2,000 acres downstream steel hub:** Set up a dedicated downstream steel hub for job creation and value addition with 50-75 units processing and manufacturing a variety of products such as fabrications, metal ancillaries, rebars, cold rolled coils, rolling stock, utensils, power tools, etc. This complex can potentially be developed proximate to the steel cluster at Nakkapalli. Another suitable location may be near the Visakhapatnam steel plant, where the state could leverage 2,000-2,500 acres of unutilised land available with RINL for downstream steel manufacturing. To enable this complex, VER will need to attract private investments in the range of $800 million to $1 billion
4. **Improving RINL's overall capacity and utilisation rates:** Another key driver will be improvement in RINL's steel output through an increase in capacity utilisation from the current 60-65% to 80-85% by FY32, while further expanding total capacity from 7.3 MMTPA currently to 10-12 MMTPA by FY32
5. **Expansion of pellet plant in Visakhapatnam:** The expansion of the existing pellet plant in Visakhapatnam from 8 to 12 MMTPA to further enhance pelletisation capacity is already planned and will require private investments of $100-200 million. Akin to the greenfield integrated steel plant, this pellet plant is also connected by a slurry pipeline to NMDC's Bailadila mines

2. Flagship sector: Petrochemicals, chemicals and gas

Aspiration for VER

VER should develop one of India's largest mixed-feed crackers (1.5 MMTPA capacity), a 2,000 acres cracker proximate downstream and specialty chemical hub, and complete the gas grid to enable natural gas utilisation. This initiative is projected to deliver a GVA increase of $4-4.5 billion and generate 65,000-75,000 incremental jobs. Achieving this will require total investments of $9-10 billion by FY32, including $8.5-9.5 billion in private sector infusion.

A deep-dive into each of these three elements is provided below:

2.1. Petrochemicals and Chemicals

Context

As of 2024, India's chemicals market is estimated to be valued at $220-240 billion. With projected annual growth of 9-10%, the market is poised to expand three to four times, reaching $850-1,000 billion by 2040, capturing an estimated 10-12% share of the global chemicals industry.[8] In volume terms, India produces 50-55 MMTPA of chemicals, of which 40-45 MMTPA comprise basic petrochemicals, intermediates, downstream, and specialty chemicals. The remainder includes inorganic chemicals (such as carbon black and calcium carbonate) and alkali chemicals (such as caustic soda).[9]

The Indian chemical industry benefits from surplus production of butadiene (C4), benzene (C6) and paraxylene (C8). However, it faces a shortfall in ethylene (C2) and propylene (C3), as well as intermediates and downstream chemicals derived from it.

In FY24, India was a net importer of several key upstream chemicals and intermediates, importing $2-3 billion worth of high-density polyethylene, $2-3 billion of polypropylene, $1-1.5 billion of styrene, $0.5-0.75 billion of PVC, and $0.5-0.75 billion of MEG, among other chemicals. This dependency stems primarily from limited petrochemical cracker infrastructure. Presently, India has only 10-12 petrochemical crackers and will require an additional 13-15 crackers by 2040 to reduce import dependency for C2 and C3-based chemicals and to ensure local availability of essential building blocks and intermediates.

Amongst states, Gujarat leads petrochemical and chemical production, contributing 31% to the country's chemical GVA and hosting five petrochemical crackers, along with major chemical hubs at Dahej, Jamnagar, Vadodara, and Hazira.

Andhra Pradesh is the 3rd largest contributor to India's chemical GVA (5.4%) and the 6th largest contributor in terms of value of output (4.4%). VER accounts for nearly 70-75% of the state's chemical GVA. It hosts several small- to medium-scale units of leading players, including a paint manufacturing facility, a caustic soda plant, and multiple agrochemical and fertiliser units located across Visakhapatnam, Anakapalli, Srikakulam, and East Godavari districts. In terms of the upstream ecosystem, VER hosts HPCL's 15 MMTPA refinery in Visakhapatnam, capable of producing 0.7-0.8 MMTPA of naphtha, a critical feedstock for petrochemicals.

Proposed interventions to achieve VER's aspiration

Similar to port, refinery and cracker proximate hubs in Jamnagar and Dahej, VER can build on its endowments including four existing ports, two new ports, a 15 MMTPA refinery, and a diverse chemical ecosystem to develop one of India's leading mixed-feed-cracker-based petrochemical and chemical clusters by FY32.

As an interesting benchmark, Jurong Island in Singapore has 3-4 MMTPA of cracker capacity within a 3,000 hectare energy and chemicals cluster, hosting over 100 global companies and has attracted $35-40 billion in investment over the last three decades.[10] Similarly, VER can leverage its port-proximate advantages to establish a top-tier petrochemical hub with a thriving downstream and specialty chemical manufacturing ecosystem. Moreover, planned industrial hotspots in VER, across steel, pharmaceuticals, and other sectors, will help sustain a steady local demand for petrochemicals and downstream chemicals.

Building on its existing endowments, the following interventions can transform VER into one of the premier petrochemicals, chemicals and specialty chemicals hubs of the country:

1. **Develop a 1.5 MMTPA mixed-feed cracker in VER:** VER can set up one of India's largest mixed-feed (naphtha+ethane) crackers near Mulapeta port in Srikakulam.

Developing such a cracker will require private investments of $4-5 billion by FY32. The presence of the cracker can help in:

- Creating local supply for key olefin building blocks such as ethylene (C2), propylene (C3) and butadiene (C4) and aromatics such as benzene (C6) and paraxylene (C8)
- Enabling production of bulk polymers such as polyethylene and polypropylene and intermediates such as ethylene oxide, propylene oxide, polyols, MEG and styrene used in downstream chemical production
- Enabling production of 5-7 MMTPA of basic and intermediate chemicals required for production of downstream and specialty chemicals

2. **Create a 2,000 acres cracker-proximate downstream and specialty chemicals complex:** Leveraging proximity to the proposed mixed-feed cracker at Mulapeta, and the local availability of building blocks and intermediates, VER can establish a downstream and specialty chemical manufacturing complex spread across 2,000 acres. To enable this, the region will need to attract private investments of around $3.5 billion. The complex can focus on producing downstream and high-value products such as agrochemicals, dyes and pigments, specialty polymers, food and feed additives, surfactants, performance chemicals, and construction chemicals, etc. Some examples of these high value opportunities include:
   - **Agrochemicals:** Agrochemicals comprise insecticides, pesticides, and herbicides such as mancozeb and acephate. Globally, the agrochemicals market is valued at $110-120 billion. India is the fourth-largest producer of agrochemicals, with a domestic market worth $14-15 billion, growing at a CAGR of 8-9%. By 2040, agrochemicals are projected to account for 40% of India's $70-75 billion specialty chemical export basket, supported by the country's competitiveness in the segment, driven by low input costs and availability of feedstock. With cracker proximity, VER is likely to benefit from benzene-based intermediates such as chlorobenzene, which is widely used in agrochemical production. This raw material availability, combined with existing agrochemical manufacturing units, four operational ports, and two new ports, makes VER an attractive location for developing a leading agrochemical manufacturing cluster
   - **Dyes and pigments:** This segment comprises a wide range of chemicals, from paints to food colours. Globally, the dyes and pigments market is estimated at $45-55 billion. India is a major producer with a market size of $10-12 billion. By 2040, dyes and pigments are projected to contribute 25-30% of India's $70-75 billion specialty chemical exports. A significant advantage for this industry is the proximity to a mixed-feed cracker as it enables production of ethylene- and benzene-based intermediates such as styrene, used in manufacture of synthetic dyes like azo dyes. VER can leverage cracker-enabled, cost-competitive availability of these intermediates to emerge as a preferred location for producing a wide variety of dyes and pigments

3. **Attracting anchor investors:** The important enablers for creating this ecosystem include securing an anchor investor for the cracker unit and attracting downstream and specialty chemical players to establish units in the proposed 2,000 acres downstream and specialty complex

2.2. Oil and natural gas offshore extraction in the KG basin

Context

India is the world's 3rd largest consumer of crude oil, with an estimated annual demand of 260-270 MMTPA[11] and the 4th largest refiner of crude oil with a refinery capacity of 250-260 MMTPA. The country is also the world's 12th largest consumer of natural gas, with a gas demand of 185-190 MMSCMD. However, 85-90% of India's crude oil requirement and 45-50% of its natural gas requirement are met through imports. Over the last decade, domestic crude oil production has declined at 2.5-3% and domestic gas production has grown at less than 1%.

In FY25, India produced 28-29 MMTPA of crude oil. The Mumbai Offshore Basin had the largest production contribution (40-45%), followed by the Cambay Basin (15-20%) and the Assam-Arakan Basin (15-20%).

In terms of gas, India produced 98-100 MMSCMD of natural gas, with the Mumbai Offshore Basin contributing 40-45% to the total production.

The KG Basin, with onshore and offshore areas located along the coasts of Kakinada and Dr. B.R. Ambedkar Konaseema districts in VER, contributed 30-35% to India's gas (30-35 MMSCMD) and 8-10% to India's crude oil production (2.5-3 MMTPA). The basin hosts two large-scale private-sector oil and gas players, as well as ONGC. Over the past two decades, the KG Basin has experienced multiple booms and busts in production. However, due to substantial investments by private and public sector players, and the operationalisation of new fields, the region has recorded strong growth in the last 4-5 years. In FY25, the region produced 30-35 MMSCMD of gas. This production is projected to peak soon before beginning to decline. Similarly, crude oil output has risen from less than 1 MMTPA in FY23 to 2.5-3 MMTPA in FY25, and is projected to peak over the course of this decade.

Proposed interventions to achieve VER's aspiration

To sustain current levels of oil and gas production, it will be necessary to encourage exploration of new development fields and clusters in the KG Basin. Since it takes up to six years to operationalise oil and gas fields, it will be imperative for the Ministry of Petroleum and Natural Gas to expedite and coordinate efforts with private and public players in the KG Basin to tap into the region's untapped and unexplored potential.

2.3. Completing natural gas grid and developing an LNG terminal

Context

India consumed 185-190 MMSCMD of natural gas in FY24. Demand is projected to grow at 8-12% to reach 295-365 MMSCMD by FY30, and then at 5-6% to reach 495-630 MMSCMD by FY40.[12]

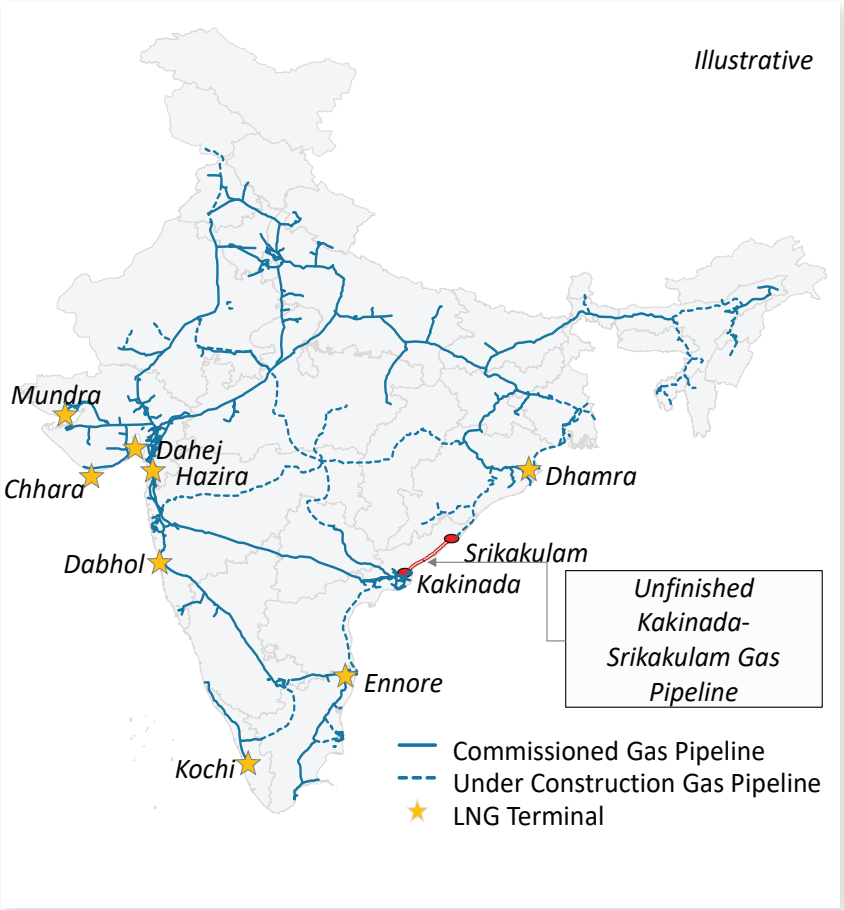
In line with VER's growth aspirations, gas demand in the region is estimated to double, from 5-7 MMSCMD to 10-15 MMSCMD by 2032-34, driven by an increase in city gas consumption and industrial growth across sectors such as chemicals, steel, pharmaceuticals, etc. This makes unlocking of the region's gas economy, a vital priority under this Economic Master Plan.

Proposed interventions to achieve VER's aspiration

With the Dahej-Kakinada pipeline already operational and Srikakulam-Angul pipeline slated to commence in 2025, completion of VER's unfinished Kakinada-Srikakulam gas pipeline (as illustrated in Figure 12) is critical to complete the national gas grid and unlock VER's gas economy. Therefore, the following interventions will be critical:

1. **Completing the Kakinada-Srikakulam gas pipeline:** A critical intervention is to complete the remaining 150-175 km stretch of the 290-300 km Kakinada-Srikakulam gas pipeline. With a minimum capacity of 20-30 MMSCMD, this will meet the region's incremental future demand and integrate VER into the national gas grid.[13] This project, which requires an additional investment of $100-150 million, should be completed in the next 12 months in coordination with the Petroleum and Natural Gas Regulatory Board (PNGRB)
2. **Complete development of planned gas terminal at Kakinada by 2028-30, with a regasification capacity of 20-30 MMSCMD:** India currently has sufficient regasification capacity till 2030, with 190-200 MMSCMD capacity operational across 8 LNG terminals with an average utilisation rate of only 50-55%. This capacity will be sufficient to meet India's projected gas demand of 295-365 MMSCMD for 2030. However, with demand projected to grow to 495-630 MMSCMD by 2040, India will need to develop additional LNG terminals. In this light, VER should complete the development of the planned LNG terminal in Kakinada by 2028-30. Developing this terminal will require private sector investments of around $900 million to $1 billion

Figure 12: National gas grid under development



3. Flagship sector: Ports and logistics

Aspiration for VER

VER should aim to become one of India's top five port clusters, with 435 MMTPA of capacity including a container capacity of 4-4.5 million TEUs by FY32, across four expanded and two new ports. This development is projected to deliver a GVA increase of $2.5-3 billion and create 50,000-60,000 incremental jobs. Achieving this will require total investments of $4-4.5 billion by FY32, including $2.5-3 billion private sector infusion.

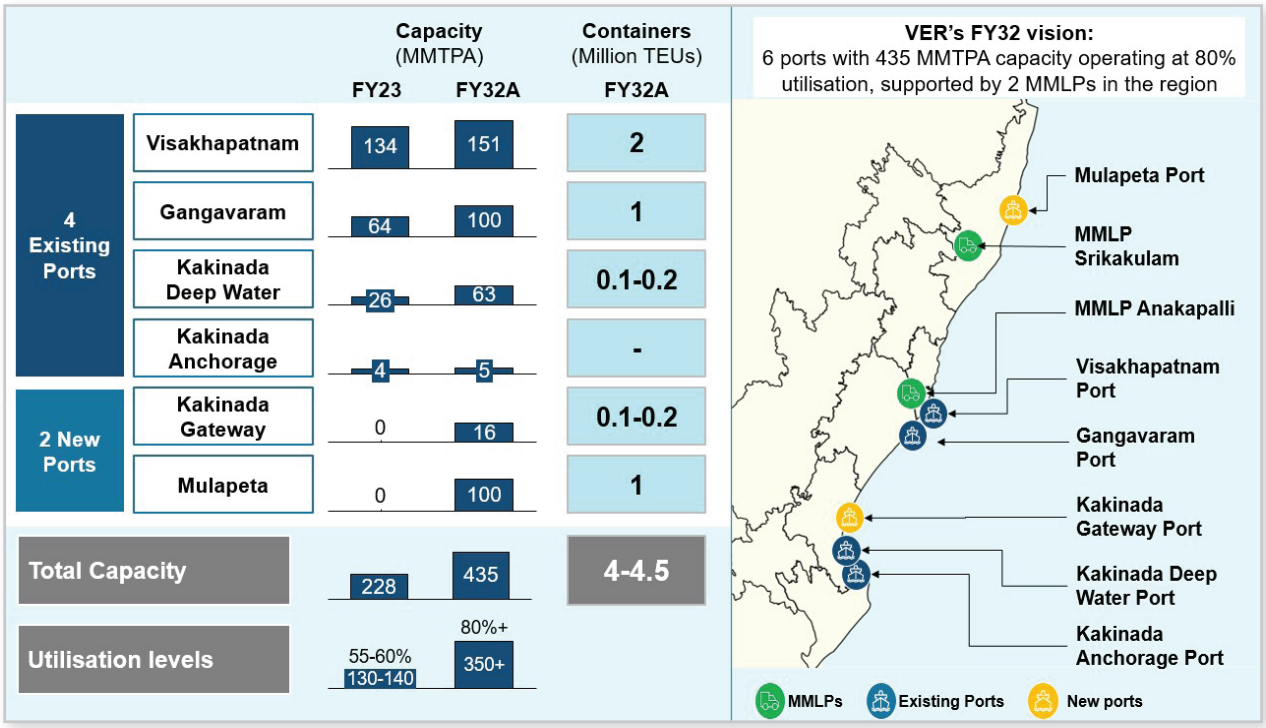
Context

India handled 1,540 MMTPA of cargo across major and non-major ports in FY24, accounting for an estimated 11-13% of global port cargo.[14] According to 'Maritime India Vision 2030' and 'Maritime Amrit Kaal Vision 2047', the country's cargo traffic is projected to increase to 2,100-2,600 MMTPA by 2030 (including 35-45 million TEUs of containers), and further to 5,400-6,800 MMTPA by 2047 (including 170-220 million TEUs of containers).[15]

Andhra Pradesh handles 12-13% of India's cargo. VER accounts for a substantial majority, managing 8-10% of the country's cargo through one major and non-major port at

Visakhapatnam, and two non-major ports at Kakinada.[16] Currently, VER's ports are operating at 55-65% capacity utilisation, due to congestion on major rail and road evacuation routes, limited hinterland connectivity, and a lack of port-proximate manufacturing. This Economic Master Plan sets out a strategy to attract significant port-proximate manufacturing and industry to the region, while also addressing key infrastructural bottlenecks to improve port evacuation and hinterland rail and road connectivity (detailed in chapter on Growth Driver 7). Together, these measures will provide the necessary impetus to establish VER as one of India's top five ports and logistics clusters.

Figure 13: VER's FY32 ports and logistics vision



Proposed interventions to achieve VER's aspiration

In line with India's 2030 and 2047 port-traffic aspirations, incremental regional cargo generation from the development of 12-15 port-proximate manufacturing nodes, and enhanced connectivity infrastructure, the region should target 2-2.5 times increase in cargo volume, rising from the current 130-140 MMTPA to 350 MMTPA by FY32. To accommodate this growth, VER will need to double its port capacity from 228 currently to 435 MMTPA by FY32 by expanding four existing ports, developing two greenfield ports, and establishing two Multi-Modal Logistics Parks (MMLPs). These interventions are as detailed below:

1. **Develop 12-15 port-proximate manufacturing nodes:** Develop industrial nodes across the 10 priority-sub sectors as envisioned in this master plan to increase volume of regional cargo generated and reduce dependency on hinterland cargo generation

2. **Improve rail and road connectivity:** Ensure timely completion of the rail (5 ongoing and 7 new), and road (8 ongoing and 9 new) connectivity projects to enhance port evacuation and improve hinterland connectivity (further detailed in Growth Driver 7)
3. **Greenfield development of Mulapeta Port:** Develop Mulapeta Port with a target capacity of 100 MMTPA and 1 million TEUs by FY32, featuring a deep draft of 17-20 metres, with the long-term potential to evolve into a 300 MMTPA mega port by 2047
4. **Greenfield development of Kakinada Gateway Port:** Develop 16 MMTPA Kakinada Gateway Port, with all weather, deep-water and multi-cargo capabilities, including 0.1-0.2 million TEUs of container capacity and a deep draft of 17-19 metres
5. **Expansion of Visakhapatnam Port:** Expand the port from 134 to 151 MMTPA, including container capacity enhancement from 1.3 to 2 million TEUs and an existing deep draft of 18-19 metres
6. **Expansion of Gangavaram Port:** Expand the port from 64 to 100 MMTPA, with container capacity increasing from 0.6 to 1 million TEUs and an existing deep draft of 19-21 metres
7. **Expansion of Kakinada Deep Water Port:** Expand the port from 26 to 63 MMTPA, including 0.1-0.2 million TEUs of container capacity and an existing draft of 14-15 metres
8. **Expansion of Kakinada Anchorage Port:** Expand the port from 4 to 5 MMTPA, to complement the growing Kakinada maritime metropolis
9. **Establish 2 multi-modal logistics parks (MMLPs):** Create two 400 acres parks with a planned cargo handling capacity of 35-50 MMTPA each, in Anakapalli and Srikakulam, located within a 50-150 km radius of 2-3 ports
10. **Improve port capacity utilisation from around 60% to over 80%:** Invest in modernisation, mechanisation, and logistics evacuation to increase utilisation to global benchmark levels and efficiently capitalise on the new cargo generated through the port-proximate manufacturing nodes and the improved hinterland connectivity infrastructure
11. **Improving operating metrics:** Achieve key operational targets set out in India's 2030 and 2047 maritime vision including:
    - Doubling average output per ship-berth day from the current 12,000-17,000 tonnes to over 30,000 tonnes by 2030
    - Reducing average vessel turnaround time from around 3 days to less than 2 days by 2030, moving closer to global benchmarks of 0.3-0.6 days in countries such as Japan and China

With these interventions, 4 ports, namely Visakhapatnam, Gangavaram, Mulapeta, and Kakinada Gateway port can have deep draft berths of 17- 21 metres, thereby enabling docking of capesize vessels, large bulk carriers and the largest container ships (over

20,000 TEUs capacity) across VER's coastline.

Through the aforesaid initiatives, VER is well-positioned to emerge as one of India's top 5 port and logistics hubs with 435 MMTPA capacity by FY32, comparable to the country's largest port clusters as well as international ports, such as:

- **Mumbai port hub with 545-565 MMTPA capacity:** Includes J.L. Nehru port (140-145 MMTPA), Mumbai port (80-85 MMTPA), Vadhavan port (300 MMTPA) and Dighi port (25-35 MMTPA)
- **Mundra-Kandla port hub with 485-500 MMTPA capacity:** Includes the Deendayal port (265-270 MMTPA) and Mundra port (220-230 MMTPA)
- **International ports frequently ranked amongst the top ten ports of the world:** Such as the Busan port in South Korea with 400-420 MMTPA cargo capacity and the Rotterdam port in Netherlands which handles 425-450 MMTPA

4. Flagship sector: Pharmaceuticals and medical technology

Aspiration for VER

VER should aspire to become India's number one pharmaceutical and medical technology cluster, by developing new greenfield hubs such as an integrated life-sciences cluster in Srikakulam, a MedTech Zone 2.0 in Anakapalli, and a bulk drug park in Nakkapalli.

These new hubs should target $10-15 billion in additional production and $4-5 billion in new exports by FY32. Overall, this initiative is projected to deliver a GVA increase of $5-6 billion and generate 90,000-110,000 incremental jobs. Achieving this will require total investments of $7-7.5 billion by FY32, including $6.5-7 billion private sector infusion.

Context

The global pharmaceuticals market is currently valued at $1.6 trillion, with India accounting for a 3-4% share (approximately $55-60 billion). The Indian market is projected to witness robust growth, reaching $120-130 billion by 2030.

India is already the world's largest supplier of generics, accounting for 20% of global supply. The country exports $25-30 billion of pharmaceuticals, with the portfolio predominantly composed of formulations (70-75%) and bulk drugs and intermediates (15-20%). Despite being the world's third-largest exporter by volume, India ranks 11th in terms of pharma exports by value. This disparity highlights a significant opportunity for market repositioning by capitalising on the increasing global demand for value added products (such as speciality generics, vaccines, biosimilars, gene and cell therapies, and biologics). India has the potential to play a more strategic role in the global healthcare value chain and double its pharmaceutical exports to $55-65 billion by 2030.[17]

The global medical technology market is valued at $575-625 billion and is projected to grow

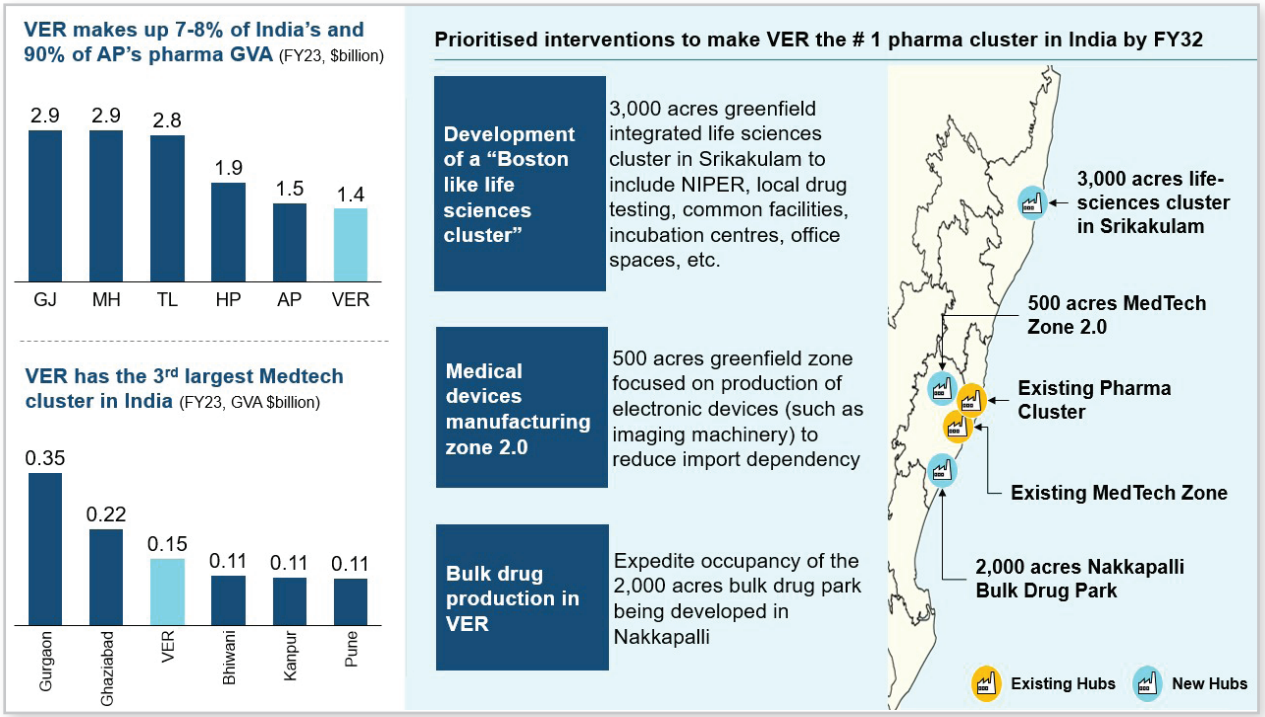
to $850-900 billion by 2028. India's medical technology and devices market is projected to expand from $10-15 billion in 2024 to $50 billion by 2030. By segment, electronic medical equipment is the largest contributor to the Indian market, with a 50-60% share, followed by disposables and consumables at 20-30%.

India remains a net importer of medical devices, with $8-9 billion in imports significantly outweighing $3-4 billion in exports. Electronic equipment accounts for 60-65% of India's imports and 35-40% of exports. Although India currently makes up only 1-2% of the global market, it has the potential to capture 10-12% over the next 25 years.[18] With electronic equipment making a major chunk of both India's imports and exports, VER can tap into this segment and drive growth in its medical devices industry.

Andhra Pradesh is already among India's top 5 pharmaceutical manufacturing states; with VER accounting for 90% of the state's and 7-8% of the country's pharmaceutical GVA. VER has long been a torchbearer for the industry, hosting one of India's earliest plug-and-play pharmaceutical and medical devices parks and the third-largest medical technology cluster in the country.

With over 80-90 units in VER's pharmaceutical cluster and 155-160 units in its medical technology cluster, the region's existing hubs are a force to be reckoned with. However, these clusters have already reached 80-90% occupancy, leaving limited scope for brownfield expansion. Consequently, new greenfield hubs will need to be developed to drive the industry's growth in VER by FY32.

Figure 14: VER's FY32 pharmaceutical and medical technology vision



Proposed interventions to achieve VER's aspiration

Building on its strong foundations, VER can aspire to become India's number one pharmaceutical and medical technology hub. To realise this ambition, the following greenfield developments are recommended:

1. **Develop a 3,000-acres Boston-style life sciences and pharmaceutical cluster near Mulapeta port in Srikakulam:** The proposed cluster should be developed as an integrated pharma-city campus featuring a NIPER, multiple drug-testing laboratories, incubation centres, and world-class R&D infrastructure to produce high-value formulations, patented drugs, specialty generics, biosimilars, biologics, and cell and gene therapies. The cluster can also specialise in manufacturing complex form factors such as soft-gel capsules, inhalants, and injectables. A cluster of this scale will need to attract around $3.5 billion in private investments and has the potential to generate $5-8 billion in revenue and $2-2.5 billion in exports by FY32. An important enabler to drive the cluster's innovation ecosystem would be to secure the NIPER unit
2. **Establish 'MedTech Zone 2.0', in Anakapalli:** With the current MedTech zone almost at occupancy, VER should establish a second 500-acres medical technology cluster. A cluster of this scale will need to attract private investments of $2-2.5 billion and has the potential to generate $2-3 billion in revenue and $1-1.2 billion in exports by FY32. This cluster can focus on electronic equipment such as MRI machines, electrocardiographs, X-ray machines, radiation generation units and other high-end technologies for both import substitution and exports
3. **Complete development and enable 80-90% occupancy of the upcoming 2,000-acres bulk drug park in Nakkapalli:** Global API consumption is projected to increase from $225-250 billion to $325-350 billion by 2030. In the same time frame, due to its rising competitiveness in costs and skilled labour, India has the potential to increase its exports from $4-6 billion to $10-12 billion. This under-development bulk drug park at Nakkapalli can emerge as a ready-to-move in hub for cost-competitive API and intermediate manufacturers and can potentially produce $3-4 billion worth of APIs and intermediates, with $1-1.5 billion worth of exports by FY32. The park will need to attract around $1 billion in private sector investments

5. Emerging sector: Clean technology manufacturing

Aspiration for VER

VER can emerge as a premier clean technology (clean-tech) hub consisting of 0.5 MMTPA green hydrogen production, 5-10 GW of integrated solar module manufacturing, and 2-4 GW of electrolyser manufacturing. This could lead to an incremental GVA of $2-2.5 billion and the creation of 60,000-70,000 new jobs. To facilitate this, VER will need to attract private sector investments of $12-13 billion by FY32.

Context

Clean-tech manufacturing is witnessing rapid global expansion. It encompasses a wide variety of value chains including solar modules, wind turbines, electrolysers, batteries, and heat pumps. Valued at approximately $700 billion today, the global clean-tech market is projected to more than triple, exceeding $2 trillion by 2035.[19] In India, the clean-tech manufacturing industry is currently estimated at $10-15 billion and is projected to grow to $35-50 billion by 2030, driven by ambitious targets for renewable energy, decarbonisation, and green hydrogen production.

Within the national context, VER is well-positioned to emerge as one of the leading clean-tech manufacturing hubs for India with some momentum already beginning to show. On the basis of planned investments, the state's aspirations and market trends, three high-potential sub-sectors have been identified to anchor VER's clean-tech vision: 1) solar modules, 2) electrolysers, and 3) green hydrogen and its derivatives.

As of FY24, India is emerging as a major solar manufacturing player, with annual solar module manufacturing capacity of 50-60 GW, solar cell manufacturing capacity of 18-22 GW, and wafer and polysilicon manufacturing capacity of 5-9 GW each.[20] With increasing penetration of renewable energy and a push for backward integration, India's solar module manufacturing capacity is projected to reach 100-120 GW per annum by 2029-30, with at least 25-30% backward integrated till the polysilicon stage.[21]

While the solar module industry is rapidly developing, India's electrolyser industry is still in early stages with manufacturing capacity of only 1-2 GW. However, India has set a bold aspiration to scale electrolyser manufacturing capacity to 60-100 GW per annum by 2030. Additionally, the country is also targeting to produce 5 MMTPA of green hydrogen in the same timeframe. [22]

In a similar vein, Andhra Pradesh has set a target for producing 20 GW of solar module production with complete backward integration and 5 GW of electrolyser manufacturing capacity by 2029.[23] The state has also set a target for producing 1.5 MMTPA of green hydrogen by 2029 with an aspiration to become a global hub for green hydrogen export. VER is well positioned to help the state meet its clean-tech manufacturing and green hydrogen production targets, with ongoing momentum from projects such as NTPC's planned 0.5 MMTPA green hydrogen hub at Pudimadaka, Anakapalli, and a privately owned 1 MMTPA green ammonia and 2 GW electrolyser manufacturing unit in Kakinada.

Proposed interventions to achieve VER's aspiration

1. **Development of a 0.5 MMTPA green hydrogen hub:** With 1,200 acres of land already allotted and a planned investment of $10 billion, this project targets the production of 0.5 MMTPA of green hydrogen, 1.5 MMTPA of green ammonia, 0.5 MMTPA of green methanol and 0.5 MMTPA of SAF/urea. The project could bring in further investments of $12 billion to Andhra Pradesh for creating 20 GW of RE infrastructure in the southern

part of state. The hub will also be supported with a transmission corridor, port berths, chemical storage, logistics zone and proximate manufacturing facilities. Additionally, the hub will have a dual-focus towards some production for domestic consumption in the near-term and at-scale export of green hydrogen derivatives in the medium-long term. Planned in 4 phases by FY32, the hub is expected to produce 0.1-0.2 MMTPA of green ammonia for the local market while exporting 1.3-1.4 MMTPA of green ammonia and 0.5 MMTPA of green methanol by 2028. Completing this project will help meet 10% of India's and 30% of the state's green hydrogen target and drive $1.5-2 billion of green hydrogen derivatives exports by FY32

2. **Planned green ammonia and electrolyser manufacturing facility:** A private conglomerate is developing a 1 MMTPA green ammonia and 2 GW electrolyser manufacturing facility in Kakinada. This facility plans to export 0.25 MMTPA of green ammonia. Completing this project will help meet 40% of the state's electrolyser production target and generate $0.2-0.3 billion in green ammonia exports[24]
3. **Creating a 2,000 acres multi-product downstream clean-tech hub:** In addition to completing planned projects, VER should aim to create a 2,000 acres multi-product downstream clean-tech manufacturing hub in Anakapalli, producing:
   - 5-10 GW of fully integrated solar modules, meeting 25-50% of the state's targets and exporting 1-3 GW by FY32 with the potential to bring in $0.5-1 billion in export revenue
   - 1-2 GW of additional electrolyser capacity, meeting another 20-40% of the state's production targets

To enable these interventions, it will be important to attract multiple large anchor investors for integrated solar module and electrolyser manufacturing. The state already has a robust policy architecture (Integrated Clean Energy Policy 4.0 2024-29) to promote investor attraction as detailed in Figure 15.

Figure 15: Key highlights of Andhra Pradesh's Clean Energy Policy 4.0

The Policy aims to create Renewable Energy Manufacturing Zones (REMZ) across the state for investor attraction across green hydrogen, solar and electrolyser manufacturing. Key highlights of the policy include:

1. **Key incentives:** 25% capital subsidy on FCI, subsidy of ₹1 per unit of electricity, electricity duty and net-SGST reimbursement, open access charges exemption and doorstep provision of industrial water with 25% exemption on water charges.
2. **Off take guarantee:** 10% of total annual solar capacity (MW) to be procured by DISCOMs from manufacturers that produce across the full value chain (Ingot–Wafer–Cell–Module).

6. Emerging sector: Shipbuilding, ship-repair and ancillary manufacturing

Aspiration for VER

VER should target to build one of India's largest shipbuilding, ship-repair and ancillary manufacturing clusters with 0.5 million Gross Tonnage (GT) capacity near Mulapeta port. This is projected to deliver a GVA increase of $1.4-1.6 billion and create 60,000 - 70,000 new jobs. Achieving this will require total investments of $0.5-0.7 billion by FY32, including $0.4-0.5 billion private sector infusion.

Context

Globally, the shipbuilding industry produces 60-70 million GT of ships annually (equivalent to 1,300-1,500 Panamax vessels or vessels capable of passing through the Panama Canal), with 90-95% being produced in China, South Korea and Japan.[25]

India's share in global shipbuilding production is less than 1%, with a capacity of only 0.5-0.6 million GT across public and private yards.[26] Furthermore, very few yards in India have capacities exceeding 50,000 GT, with some of the largest yards having a capacity of 150,000-200,000 GT[27] (versus global best clusters, such as Ulsan in South Korea, with capacities of 4-5 million GT).

However, as reflected in 'Maritime India Vision 2030' and 'Maritime Amrit Kaal Vision 2047', India is aspiring to improve its global rank in shipbuilding (16th currently) to emerge as a top 10 player by 2030 and top 5 player by 2047. To facilitate this, the country is aspiring to develop four shipbuilding mega clusters, each with 1-1.2 million GT capacity, targeting an overall national shipbuilding capacity of 4-5 million GT by 2047.[28]

Similar to shipbuilding, India has set an aspiration to become one of the world's top 10 ship-repair hubs by 2030. The global ship-repair market is estimated at $15-25 billion and is projected to reach $40 billion by 2030.[29] Currently, the global market is dominated by shipyards in China, South Korea, Singapore, and the UAE, supported by large dry docks, skilled workforces, advanced technology, and at-scale infrastructure. By contrast, India contributes only 1-2% to the global ship-repair market, with limited capability to service large vessels due to shallow drafts and shortage of dry docks capable of accommodating bigger ships. The domestic industry also faces structural impediments, including a weak local ancillary manufacturing base leading to limited availability of spare parts and longer turnaround time.

Currently, most of India's shipyards are located in states with substantial maritime traffic such as Maharashtra, Gujarat and Tamil Nadu. Andhra Pradesh has set an aspiration to develop world-class shipyards, aiming to contribute 25% of the country's shipbuilding capacity by 2047, with plans to establish a cluster in the southern part of the state.

To further support the state's aspiration, VER can leverage its planned local availability of steel and its aspiration to achieve 2-2.5 times increase in maritime traffic to develop an international cluster for shipbuilding, ship-repair, and ancillary manufacturing with world-class facilities.

At present, VER accounts for 8-10% of India's shipbuilding capacity across two shipyards: Hindustan Shipyard Limited (HSL) in Visakhapatnam (40,000-50,000 GT), and a private shipyard in Kakinada (4,000-5,000 GT). In addition, development of the semi-built facility at Kakinada could be revived to provide an additional 5,000-10,000 GT of capacity.

With its diverse steel manufacturing base, strategic port proximity, and planned deep-draft capability at Mulapeta Port, VER has the potential to scale its shipbuilding capacity tenfold, anchored by a new 0.5 million GT cluster near Mulapeta.

Proposed interventions to achieve VER's aspiration

1. **Develop one of India's mega shipbuilding, ship-repair and ancillary manufacturing clusters near Mulapeta port:** VER should develop one of India's largest clusters, spread across 1,000 acres near Mulapeta port with a 0.5 million GT capacity, aspiring to contribute 10-15% to India's and 50% to AP's 2047 shipbuilding aspirations, by FY32. The shipbuilding cluster should have the following:
   - 3-5 world-class dry docks to enable simultaneous production of vessels of various sizes (100,000-300,000 DWT) and reduction in turnaround times, similar to leading yards in South Korea and Japan
   - 2-3 additional dry docks to enable ship-repairing in tandem with shipbuilding activity
   - A dedicated ancillary manufacturing complex for production of castings, heavy metal fabrications, ship components and spare parts to improve cost-competitiveness and enhance regional job creation
2. **Attracting anchor investors:** To enable a shipbuilding, ship-repair and ancillary manufacturing cluster of this scale, it will be critical to attract leading global shipbuilding players from established hubs like South Korea and Japan. Further, VER will need to attract at-scale manufacturers of major ancillaries such as engines, shafting and propulsion systems, as well as MSMEs for producing sheet fabrications, insulation material, cable manufacturing, etc.
3. **Creation of a dedicated shipbuilding and ship-repair policy:** Another key enabler will be the creation of a dedicated shipbuilding and ship-repair policy with necessary incentives to attract investors and facilitate the creation of this cluster. The policy intervention has been elaborated further in the chapter 'Projectisation, policies and institutional mandates'.

Figure 16: FY32 shipbuilding, ship-repair & ancillary manufacturing vision

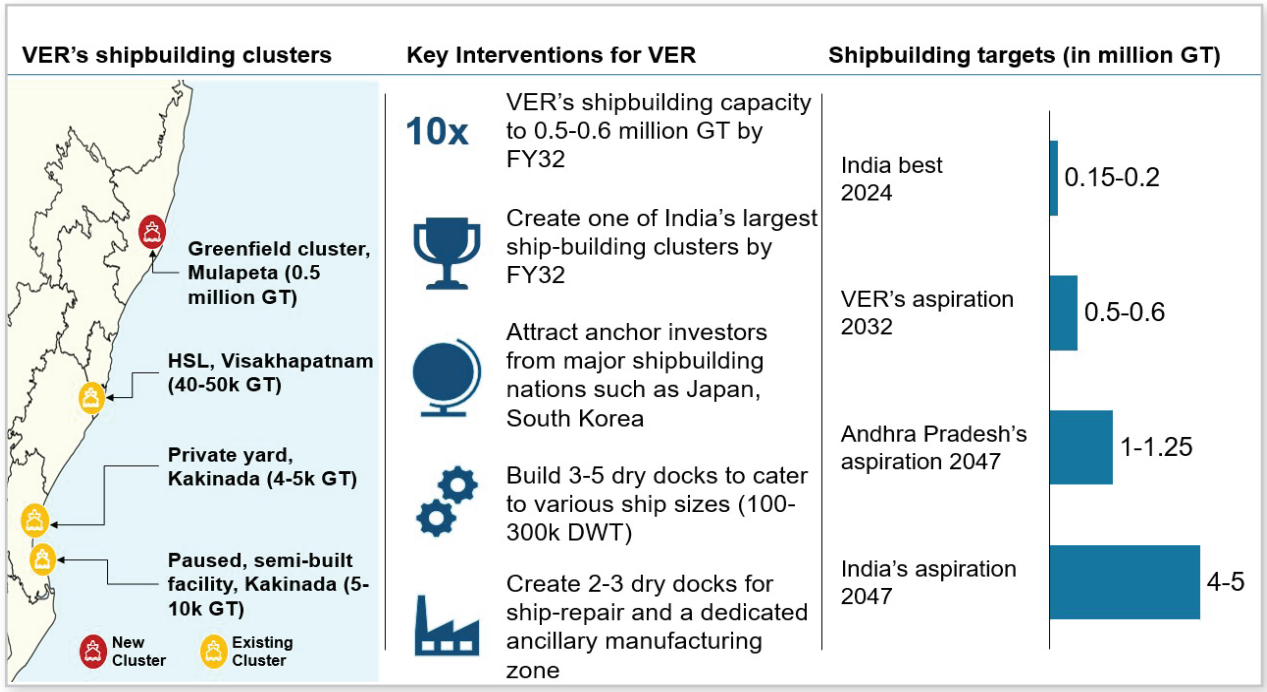
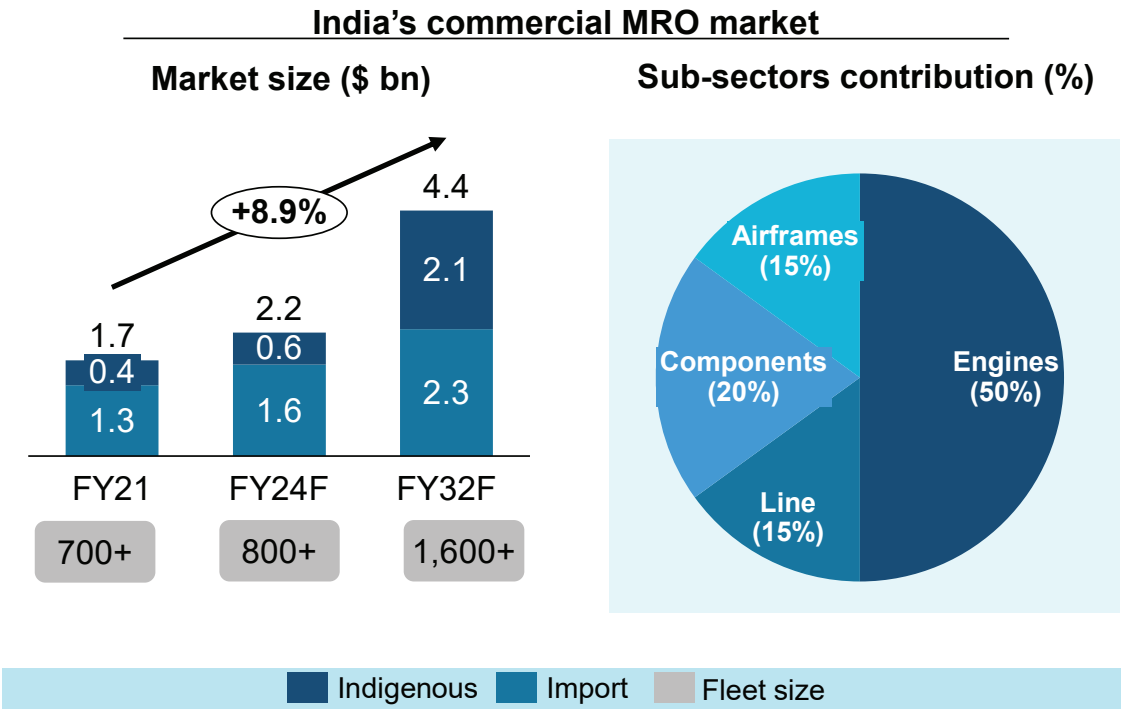


Figure 17: Aircraft MRO potential in VER

With 800+ new commercial aircraft and 300 new defence aircrafts expected to be added to the Indian fleet by FY32, the Indian aviation MRO sector is projected to nearly double from the current $4-4.5 billion to $7.5–8 billion by FY32. Of this, the commercial MRO segment constituted $1.7 billion in FY21 and is projected to grow to $4.4 billion by FY32 as shown below:



Commercial MRO in India

- India is one of the fastest-growing commercial aviation markets. The country's fleet is expected to double to 1,600 aircrafts by FY32
- Indian airlines currently import 75% of key services like engine repair and components from other countries, utilising domestic providers (such as AIESL, GMR, and Indamer) for airframe and line maintenance
- 6 urban hotspots (Delhi, Mumbai, Bengaluru, Chennai, Hyderabad and Kolkata) house 75% of India's MRO facilities. However, **land and labour constraints are driving stakeholders to explore tier-2 cities**

Opportunity for VER

- VER should create a MRO hub at the upcoming international airport at Bhogapuram
- Using this new facility, VER has the potential to emerge as a leading commercial MRO hub, capturing 10% of the market ($0.4 billion) and creating 20,000 new jobs by FY32

7. Emerging Sector: Defence (naval) manufacturing

Aspiration for VER

VER should create a 500 acres multi-product defence manufacturing hub in Anakapalli. VER can aspire to meet 10-20% of India's naval production target, leading to an incremental GVA of $0.2-0.5 billion and creation of 15,000-20,000 new jobs. Achieving this will require total investments of $0.3-0.4 billion by FY32, including $0.2-0.3 billion private sector infusion.

Context

Over the past 8-10 years, India's defence manufacturing industry has expanded at a robust pace of 10-15% annually, reaching $15-16 billion of production in 2024.[30] To further catalyse India's indigenisation and export aspirations, the country is targeting $30-35 billion of defence production by 2029. While the majority of the defence-aerospace industry is concentrated in the Bengaluru-Hyderabad-Chennai corridor, much of the non-aerospace defence sector, including weapons, land vehicles, ammunition, ordnance, and naval manufacturing, remains dispersed across the country.

Within this landscape, VER holds a distinctive advantage due to its robust naval presence. It hosts the Eastern Naval Command, DRDO's Naval Science and Technological Laboratory, and is home to an upcoming naval base. These assets make VER strategically well-suited

to emerge into a national hub for naval and related defence manufacturing, with a potential to contribute 10-20% to India's naval production by FY32.

Proposed interventions to achieve VER's aspiration

VER has the potential to manufacture $1-1.5 billion worth of naval and related defence products by undertaking the following interventions:

1. **Create a 500+ acre multi-product complex with a focus on defence (naval) manufacturing in Anakapalli:** The complex can focus on production of naval components, systems and weaponry such as propulsion systems, launchers, underwater imaging, optronics, turbines, engines and torpedoes
2. **Facilitate plug-and-play, dust-free and humidity-controlled facilities:** Plug-and-play readiness will enable production of high volumes of low-medium technology panels consumed across land, sea and air-based systems such as sonar components, mechanical and piping
3. **Manufacturing of wearables:** Leverage proximity to chemicals and electronics industries to produce wearables used by all military forces such as night vision goggles, composite armour, bulletproof jackets, and exoskeletons
4. **Attract anchor investors:** To enable a cluster of this scale, attracting leading private sector and PSU players from India's naval and related defence manufacturing industry will be necessary. Private investments of around $200-300 million will need to be attracted

8. Emerging sector: Electronics and electronic components

Aspiration for VER

VER should create a 500-1,000 acres multi-product plug-and-play electronics and components manufacturing zone near Visakhapatnam and aspire to produce $10-15 billion worth of goods to meet 20-30% of AP's electronics target by FY32. This can lead to an incremental GVA of $1.5-2 billion and create 60,000-65,000 new jobs. Achieving this will require private investments of $0.9-1 billion by FY32.

Context

The global electronics and components market is valued at $4-4.5 trillion, with finished electronics and electronic components contributing $2.5 and $1.8 trillion respectively. India currently contributes around 2% to the global electronics production and remains a net importer, with imports ($85-90 billion) significantly outpacing exports ($20-30 billion). To address this gap and strengthen its position in global value chains, India has set an ambitious target to scale electronics production fivefold from $100-115 billion to over $500 billion and scale exports tenfold from $20-30 billion to $240 billion by 2030.

In terms of sub-segments produced in India, mobile phones constitute 40-45%, followed by other major segments such as consumer electronics (12%), components (12%), auto-electronics (8%), and IT hardware (5%).

However, despite growth in assembly of finished electronics, India continues to import large quantities of electronic components and parts ($25–30 billion) with limited share of exports ($2-3 billion). For instance, for consumer electronics (such as televisions) around 60% of components and parts are imported.

With demand for components projected to rise from $40-50 billion today to $240-250 billion by 2030, the domestic market presents substantial potential for import substitution and localisation. To achieve the same, the country is aspiring to increase component manufacturing output tenfold from $15 billion to $150 billion and domestic value addition from the current 15-18% to more than 35% by 2030.[31]

Andhra Pradesh has a strong electronics manufacturing ecosystem spread across 3-4 major clusters (such as Sri City and Tirupati). However, VER has a negligible presence in the sector. With AP having set an electronics production target of $50 billion by 2029, one of the state's future electronics and components hubs should be developed in VER.

Proposed interventions to achieve VER's aspiration

VER should aspire to create an electronics manufacturing cluster of $10-15 billion annual revenue to meet 20-30% of the state's $50 billion production target.[32] The cluster can have a dual production focus targeting $8-12 billion of domestic production and $2-3 billion of exports by FY32.The following interventions can be game changers for VER's presence in the electronics and electronic components industry:

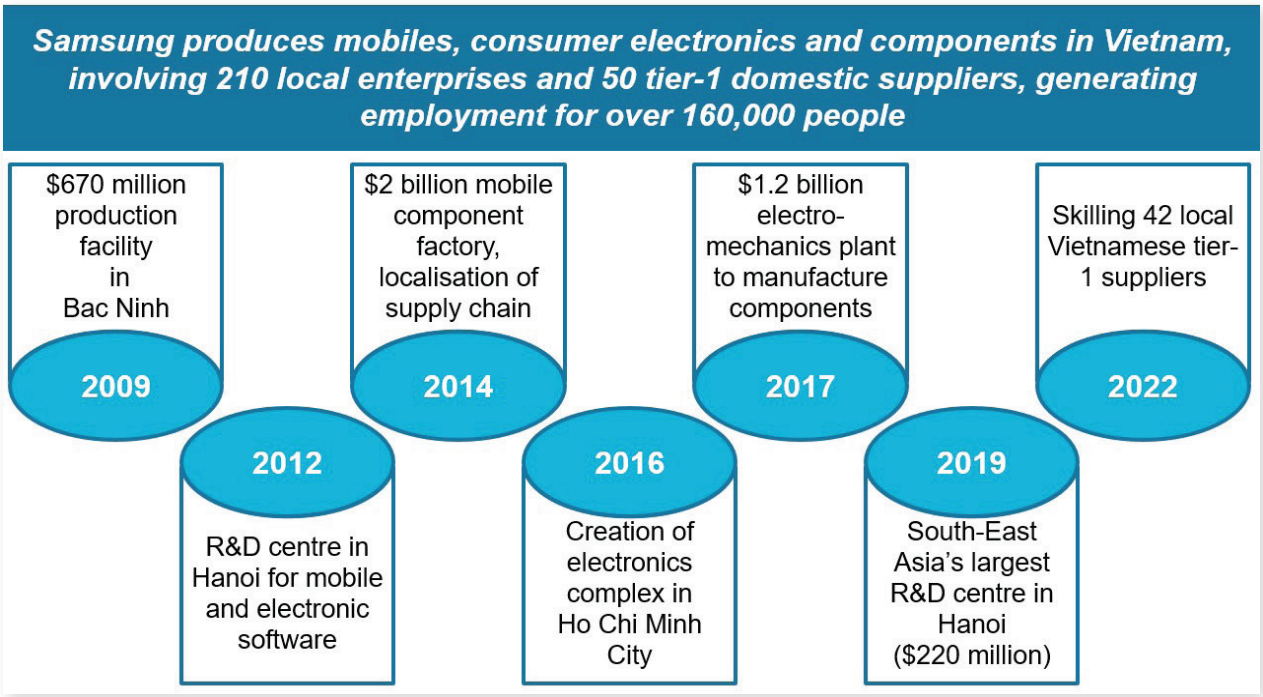
1. **Create a 500-1,000 acres multi-product park with a focus on electronics and components manufacturing near Visakhapatnam:** In line with the state's vision and domestic market trends, the zone can focus on the production of finished products such as durables and white goods, alongside low- and medium-complexity components required for their manufacture. With the domestic market for these consumer electronics projected to double from $15-20 billion currently to $35-40 billion by 2030, VER can tap into the expanding Indian demand for durables and white goods. Creating an integrated set-up that combines both component and finished goods manufacturing will enhance cost competitiveness with the potential to increase domestic value addition from the current 15-20% to more than 35%, in line with the national aspiration
2. **Targeted focus on component manufacturing:** VER should focus on select high demand electronic component categories including:
    - **SMT grade components:** These components include multi-layered PCBs, LEDs, complex sensors, diodes, audio controllers etc. and have a combined

global market size of $275-310 billion. India is targeting over $30 billion production of these component segments by 2030. These components are of medium complexity and are used in a wide variety of finished goods such as durables and white goods. With high import dependency and negligible local manufacturing, these components have high potential for indigenisation in an integrated electronics manufacturing set-up in VER

- **Non-SMT grade and electromechanical components:** These segments have a collective global market size of $370-400 billion and include both non-SMT grade components (such as low-tech PCBs, passives, resistors, capacitors, and inductors) and electromechanical components (such as connectors, switches, actuators, cables, and keypads). These components have lower production complexity and investment requirements, as compared to other segments. While these components are currently produced in India on a limited scale, the country is targeting $70-75 billion production of these segments by 2030. Due to their wide-ranging applications and consumption in the durables and white goods sector, production of these components can be targeted in VER's electronics zone
- **Printed Circuit Board assembly (PCBA):** By producing some of the aforesaid SMT grade, non-SMT grade and electromechanical components, VER could become competitive in PCBAs which are widely used across electronic segments. The global PCBA market is estimated to be valued at $600-620 billion. The Indian market is valued at $10-15 billion today and is projected to grow to nearly $80-90 billion by 2030 due to its ubiquitous use in all kinds of electronics ranging from mobile phones to washing machines. Currently, most of India's PCBA demand is met by imports. Therefore, VER can focus on building capacity by producing components like PCBAs for the local market in the near-term and then focus on leveraging cost competitiveness and port proximity to export these components in the long term and tap into their vast global value chain

3. **Attracting anchor investors at this single integrated location:** To enable VER's aspiration, the region will need to attract private investments in the range of $900 million to $1 billion. The region will need to attract several large anchor investors, capable of manufacturing both components and finished goods across a wide portfolio of products, including washing machines, televisions, refrigerators, air conditioners, dishwashers, hair dryers, and kitchen appliances. A testament to the powerful growth potential enabled by an at-scale anchor is the case of Samsung in Vietnam. Investing $20 billion over 15 years across mobile phones, consumer electronics and components manufacturing, Samsung helped transform Vietnam into one of the top 5 electronics producing nations, contributing 50% to Vietnam's electronics exports ($65 billion worth) and 16% to the country's overall exports in 2022. Samsung's journey in Vietnam has been detailed in Figure 18.

Figure 18: Case study of Samsung's electronics footprint in Vietnam



9. Emerging sector: Labour-intensive manufacturing (toys, furniture, and footwear)

Aspiration for VER

VER should set up 3 multi-product plug-and-play labour-intensive manufacturing clusters in a hub-spoke model at Nakkapalli, Vizianagaram and Srikakulam focusing on toys, furniture, and footwear. The development of these clusters could lead to an incremental GVA of $0.2-0.3 billion and create 40,000-45,000 new jobs by FY32. Achieving this will require total investments of $0.5-0.7 billion by FY32, including $0.4-0.6 billion private sector infusion.

Context

At an India level, labour-intensive industries such as toys, furniture, leather and footwear collectively add only $3-4 billion to the GVA but employ over 650,000 individuals, underpinning the sectors' importance in employment generation and achieving holistic and inclusive growth.

9.1. Footwear

India's leather and footwear industry is valued at $20-25 billion,[33] with Tamil Nadu, Uttar Pradesh and Gujarat contributing 60-70% to the sectoral GVA. Of India's $5-6 billion worth of leather and footwear exports, 50-55% are contributed by the footwear industry alone (mainly driven by leather footwear).

Globally, in terms of volume, 80-90% of footwear consumed is of the non-leather type and India is expected to witness a similar trend. India's footwear market is valued at $12-14 billion, with non-leather footwear making the largest segment (50-60% share). With an increasing presence of global brands and rising demand for non-leather segments such as athleisure footwear, India's footwear market is projected to grow at a rate of 10-13% till FY28.[34] Furthermore, as recently announced, India is aspiring to target leather and footwear exports of $50 billion by 2030.[35]

VER can tap into these tailwinds and leverage its port proximity to develop an export focused non-leather footwear cluster.

9.2. Toys

Globally, the toys industry is valued at around $100 billion and is projected to grow at 2-3% annually. China is the world's largest supplier of toys, exporting $55-65 billion of toys annually. India's toys sector is sized at $1-2 billion and is projected to grow at 11-14%.[36] While the country has 4,000+ MSMEs manufacturing toys across the country, the states of Maharashtra, Uttar Pradesh, Gujarat and Karnataka, together account for 60-70% of the country's GVA from this sub-sector.

Historically, the toys industry has been largely import-dependent, with 75-85% of toys being imported (of which 80-90% were imported from China). However, in recent years, India has emerged as a net exporter of toys on the back of strategic interventions leading to a development of a strong domestic manufacturing ecosystem. As announced in the Union Budget 2025, India is now aspiring to become a global hub for toys. Thus, the Indian toys industry has dual potential for both domestic and export focused production. Due to relatively cheaper cost of human resources, India can capture significant advantage in labour-intensive sub-segments such as dolls, action figures, plush toys, board games, etc.

9.3. Furniture

The global furniture industry has a market size of $600-650 billion. India's market, at $10-15 billion, is split 60:40 between the home and office sub-segments. The domestic furniture industry is majorly unorganised (70-80%). The organised market is valued at $3-5 billion and is highly fragmented with the top 5 players accounting for only 30-40% share.

In terms of domestic output, 50-60% of India's furniture production consists of low value-added products such as wooden frames, prefabricated goods, and beddings. In contrast, the majority of the country's imports (10-15% share) comprise finished goods such as beds and sofas.

Notably, 5 states, namely Rajasthan, Uttar Pradesh, Maharashtra, Tamil Nadu, and Gujarat, collectively contribute 40-50% to the industry's sectoral GVA.[37]

Proposed interventions to achieve VER's aspiration

Though both Andhra Pradesh (1-3% of India) and VER have a negligible footprint in labour intensive manufacturing, the state has set an ambitious vision to generate widespread employment through a hub-and-spoke model aimed at creating labour intensive clusters across districts. The vision, backed by strong policy incentives, can enable VER to increase its labour-intensive manufacturing GVA two to threefold by FY32 by undertaking the following interventions:

1. **Creation of ready-to-move-in, plug-and-play park infrastructure:** VER can set up 3 plug-and-play labour-intensive multi-product manufacturing clusters of 200-400 acres each in Nakkapalli, Vizianagaram, and Srikakulam including:

   – **Footwear:** The region can host a vibrant leather and footwear industry, with an annual revenue potential of $200-300 million. A cluster of this scale would require private investments of $100-150 million by FY32. Suggested product segments to prioritise include:

   - **Footwear:** Both leather and non-leather footwear sub-segments, such as textile and athletic footwear, have potential in the region. Andhra Pradesh already hosts a leading international manufacturer of non-leather and athleisure footwear in the Tirupati district (proximate to 4 ports). This facility is capable of producing 12-18 million pairs of footwear annually and employs 10,000-15,000 people. Similarly, VER can attract a large anchor investor from the organised footwear sector and leverage its port ecosystem to develop a leading export focused footwear cluster
   - **Other goods:** Beyond footwear, the cluster can focus on producing sustainable saddlery, harnesses, upholstery, luggage, handbags, etc.

   – **Toys:** With a rich tradition of handcrafted wooden toys such as the Etikopakka toys originating in the Anakapalli district (selected under India's 'One District One Product' initiative), VER benefits from a strong legacy in manufacturing of toys. Looking forward, VER can leverage its historic synergies and shift focus towards new-age, commercial and at-scale manufacturing for the domestic and global market with a revenue potential of $200-400 million and export potential of $100-300 million. Creating such a cluster would require private investments of $250-350 million. VER can target sub-segments such as dolls, action figures, construction toys, plush toys, art and craft toys, and plastic toys, which have high growth potential in the region

   – **Furniture and wood products:** Currently, most of India's furniture clusters are unorganised, small scale, and located inland (in northern and central India), resulting in high logistics costs and uncompetitive exports. However, with proximity to four existing and two new ports, VER can adapt the model of port-

proximate clusters seen across leading furniture-producing countries such as China (35-40% of global exports), Poland (6-7% of global exports), and Vietnam (4-5% of global exports). By leveraging reduced logistics costs through strong hinterland connectivity and port infrastructure, VER can focus on manufacturing high-value goods such as wooden and metal furniture across both the home and office sub-segments, for domestic as well as export markets. To facilitate a cluster of this size, VER will have to attract private investments of $100-150 million. This cluster has the potential to generate a revenue of around $100-150 million. High value opportunities for production include:

- **Home sub-segment:** VER can target production of finished goods such as beds, sofas, dining tables, and drawers, which account for more than 60% of India's home furniture market
- **Office sub-segment:** VER should prioritise products such as seating, desks, work surfaces, and storage units, which make up 80-90% of the office furniture market in India

2. **Best-in-class policy enablers:** To attract investors and emerge as a leading labour-intensive manufacturing zone, dedicated policy enablers would be required. The state should create dedicated policies for sectors such as toys and furniture (detailed in the chapter 'Projectisation, policies and institutional mandates'), as has been done in the past for textile and apparel, and more recently for leather and footwear

With these interventions, VER can emerge as a model for labour-intensive manufacturing, similar to Vietnam, which rose to become Asia's second-largest and the world's fifth-largest exporter of furniture within just a decade through focused development of port-proximate hubs such as Binh Duong and Binh Dinh. Today, Vietnam exports $6-8 billion worth of furniture, with almost half of its furniture manufacturers concentrated in Binh Duong around the Ho Chi Minh port cluster. Like Vietnam, VER can leverage its port-proximate advantage to strengthen labour-intensive manufacturing clusters and build a competitive export-oriented base.

10. Emerging sector: Alumina, aluminum, and titanium dioxide

Aspiration for VER

VER should leverage its local availability of minerals such as bauxite and beach sand minerals and explore the development of integrated mineral-based industries such as aluminum and titanium dioxide. This can lead to an incremental GVA of $0.6-1.2 billion and create 50,000-55,000 new jobs by FY32. Achieving this will require total investments of $5-6 billion by FY32, including $4.5-5.5 billion private sector infusion.

10.1. Alumina and aluminum

Aspiration for VER

VER can aspire to have bauxite production of 6-8 MMTPA, alumina refining of 2-2.5 MMTPA, and an aluminum smelter of 1 MMTPA with 0.5 MMTPA operational by FY32 supported by a 500 acres downstream aluminum park. This ecosystem could lead to an incremental GVA of $0.5-1 billion and create 40,000-45,000 new jobs. To enable this, VER would need to attract private investments of $4-5 billion by FY32.

Context

Global aluminum demand is experiencing consistent growth and is projected to increase substantially from 110-115 MMTPA currently to 145-155 MMTPA by 2030. However, during the same time frame, global aluminum production is projected to reach 120-125 MMTPA, creating a potential shortfall in global production.[38]

In terms of upstream input requirements, alumina demand is projected to grow from 120-125 MMTPA to 210-215 MMTPA by 2030, outpacing supply which is projected to reach 170-175 MMTPA. Thus, aluminum players across the world will need both additional aluminum and alumina production capacities, to keep up with global tailwinds.

India's demand for aluminum is projected to reach 6-7 MMTPA by 2030-32, propelled by an increasing consumption in sectors such as automobiles, construction and infrastructure. The country already has the right ingredients to build a strong integrated aluminum sector, with 7-9 MMTPA of alumina refining capacity and 23-25 MMTPA of bauxite production, with states such as Odisha contributing 65-75% to the country's bauxite production.[39] Though India is the world's second largest producer of aluminum with a production capacity of 4-4.2 MMTPA, it will have to make further investments in capacity expansion to meet incremental demand by 2030-32.[40]

In terms of resources, the country's bauxite resources are estimated between 4,000-5,000 million tonnes, with 70-80% being of metallurgical grade.[41] In terms of reserves, India's bauxite reserves are estimated to range between 640-660 million tonnes, with Odisha housing 60-70% of the country's reserves.

While Andhra Pradesh has the third highest resources in the country at 610-620 million tonnes, no reserves have been slated for production thus far. Most of the state's resources are in VER, primarily in the ASR district, scattered along a north-east to south-west belt from Ananthagiri to Pedakonda. However, these resources require further exploration and surveying to identify high-quality reserves suitable for developing an integrated bauxite-alumina-aluminum hub.

Given that VER's bauxite resources coincide with ecologically sensitive and scheduled

areas, it must be ensured that environmental and local interests are safeguarded. A decision regarding exploration or mining should be made after comprehensive environmental assessment, community consultation and adherence to relevant provisions. The respective District Mineral Foundations (DMF) in VER should be mobilised towards improving the quality of life and the standard of living in the mining regions. For instance, Odisha's District Mineral Foundations have more than $3.5 billion in accrued funds from extensive mining activities and have allocated them across 30,000+ sanctioned projects focused on drinking water supply, education, environment preservation, pollution control, healthcare, housing, sanitation, welfare, skill development, physical infrastructure and livelihood programs.

Proposed interventions to achieve VER's aspiration

With the aforesaid considerations, VER can set up an at-scale integrated aluminum manufacturing ecosystem:

1. **Bauxite:** VER should plan on producing 6-8 MMTPA of high-quality bauxite to create a competitive advantage and enable local availability of raw material. This will require extensive exploration
2. **Alumina and aluminum:** On the basis of this, VER should develop an aluminum smelter of 1 MMTPA capacity (at least 0.5 MMTPA operational by FY32), supported by an alumina refining capacity of 2-2.5 MMTPA. The smelter and refinery can potentially be located in the Anakapalli district due to its proximity to the potential metallurgical grade bauxite reserves
3. **Downstream processing:** To support downstream value addition, VER should set up a 500 acres smelter-proximate downstream aluminum park in Anakapalli, focused on production of value-added products such as extrusions, wire rods, rolled products, foundry alloys, packaging, and cables

10.2. Beach sand minerals and titanium dioxide

Aspiration for VER

VER has the potential to develop one of India's leading port-proximate titanium dioxide production units with 50,000-100,000 tonnes/annum capacity operational by FY32, supported by local beach sands mineral extraction and processing in Srikakulam. This will lead to a GVA increase of $0.1-0.2 billion and create up to 10,000 new jobs. To facilitate this, VER needs to attract around $0.5 billion in private investments by FY32.

Context

The key minerals that qualify as beach sand minerals include ilmenite, rutile, zircon, sillimanite, leucoxene, garnet and monazite. These minerals are used in a wide range

of downstream industries such as titanium dioxide, ceramics, abrasives, sand blasting, jet cutting, refractory products, armour plating, defence, and aerospace components. Globally, the market for beach sand minerals and downstream industries is currently valued at $50-70 billion.

Of these industries, titanium dioxide is the most significant, with a global market estimated at $20-30 billion. This white pigment is widely used across paints, dyes, coatings, pharmaceuticals, cosmetics, and chemicals. It is produced from beach sand minerals such as ilmenite and rutile, which are mined in coastal areas and processed at mineral separation and processing plants.

At present, India produces 350,000-450,000 tonnes of ilmenite annually, contributing only 1-2% to global production, despite holding 400-410 million tonnes of ilmenite reserves. Most of the country's ilmenite output comes from coastal states such as Odisha, Kerala, and Tamil Nadu. Andhra Pradesh, however, does not yet have a significant production footprint. That said, the state holds 20-25% of India's ilmenite reserves, with more than 50% of these reserves located in VER.

Like upstream beach mineral extraction, India has a limited presence in downstream industries, contributing 1-2% to global titanium dioxide production and less than 2% to global titanium metal production. India produces 50,000-60,000 tonnes of titanium dioxide annually from an estimated capacity of 75,000-100,000 tonnes/annum.[42] Moreover, production is limited to a few public and private players in Kerala, Tamil Nadu, Gujarat, and other states. In terms of annual production capacity, these facilities range from 10,000-50,000 tonnes and are much smaller than global scale plants of around 200,000 tonnes. Additionally, more than 70% of the country's demand for titanium dioxide is met by imports.[43]

Proposed interventions to achieve VER's aspiration

VER houses more than 50% of AP's ilmenite reserves, with strong potential for associated rutile, zircon, sillimanite, garnet, and monazite extraction. These reserves have strong potential in the Srikakulam district, including locations such as the Srikurmam region and Bhavanapadu coast. Therefore, VER should set-up one of India's largest port-proximate titanium dioxide production facilities near Mulapeta port, supported by beach sand mining, separation and processing facilities through the following interventions:

1. **Beach sand mineral extraction:** Explore potential for setting up a beach sand mineral extraction and separation facility in the Srikakulam district with an ilmenite production capacity of 300,000-400,000 tonnes/annum in addition to production of other minerals such as rutile, zircon, sillimanite, garnet, and monazite

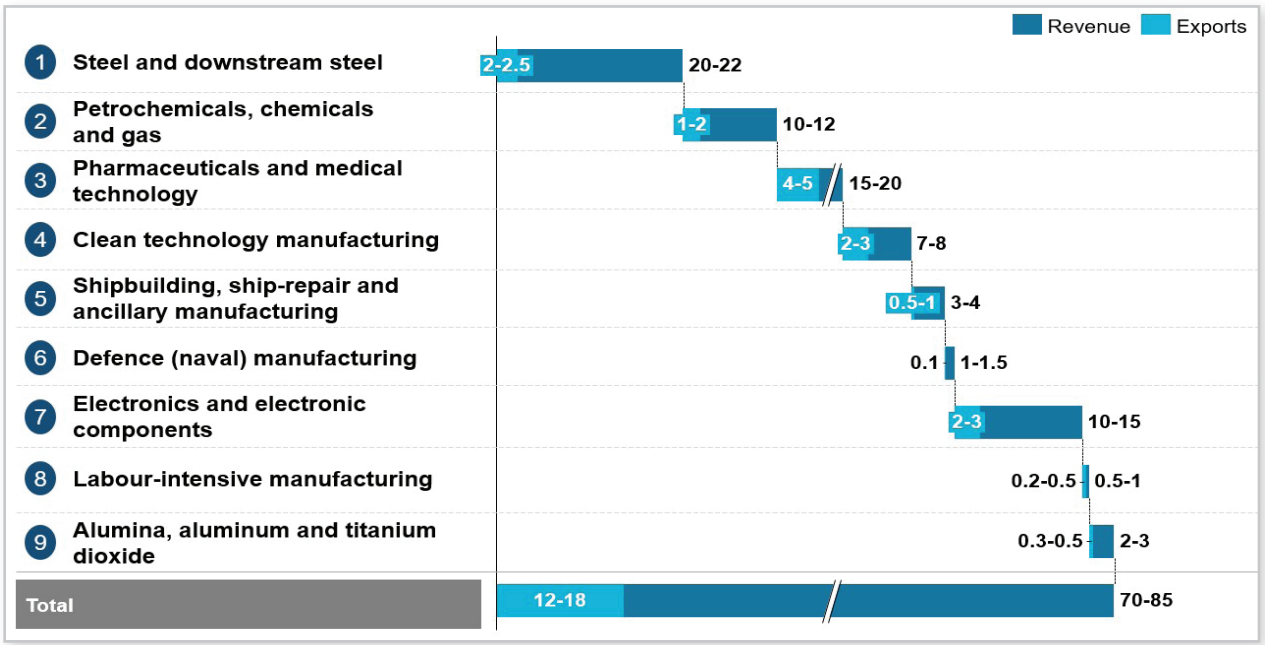
2. **Downstream titanium dioxide production:** Building on locally available raw material extracted from beach sands such as ilmenite and rutile, VER should develop one of India's largest titanium dioxide manufacturing units, with 50,000-100,000 tonnes of

annual capacity operational by FY32. This facility can be developed across 200-300 acres near Mulapeta port

Export potential from port-proximate manufacturing

VER can leverage its proximity to six ports to annually export $12-18 billion worth of manufactured items by FY32 (out of a total annual revenue of $70-85 billion). VER's export portfolio can range from labour-intensive toys and footwear to more sophisticated solar modules and pharmaceuticals, as detailed in Figure 19.

Figure 19: VER's manufacturing revenue and export potential, FY32 ($ billion)



Land, investments and policy architecture

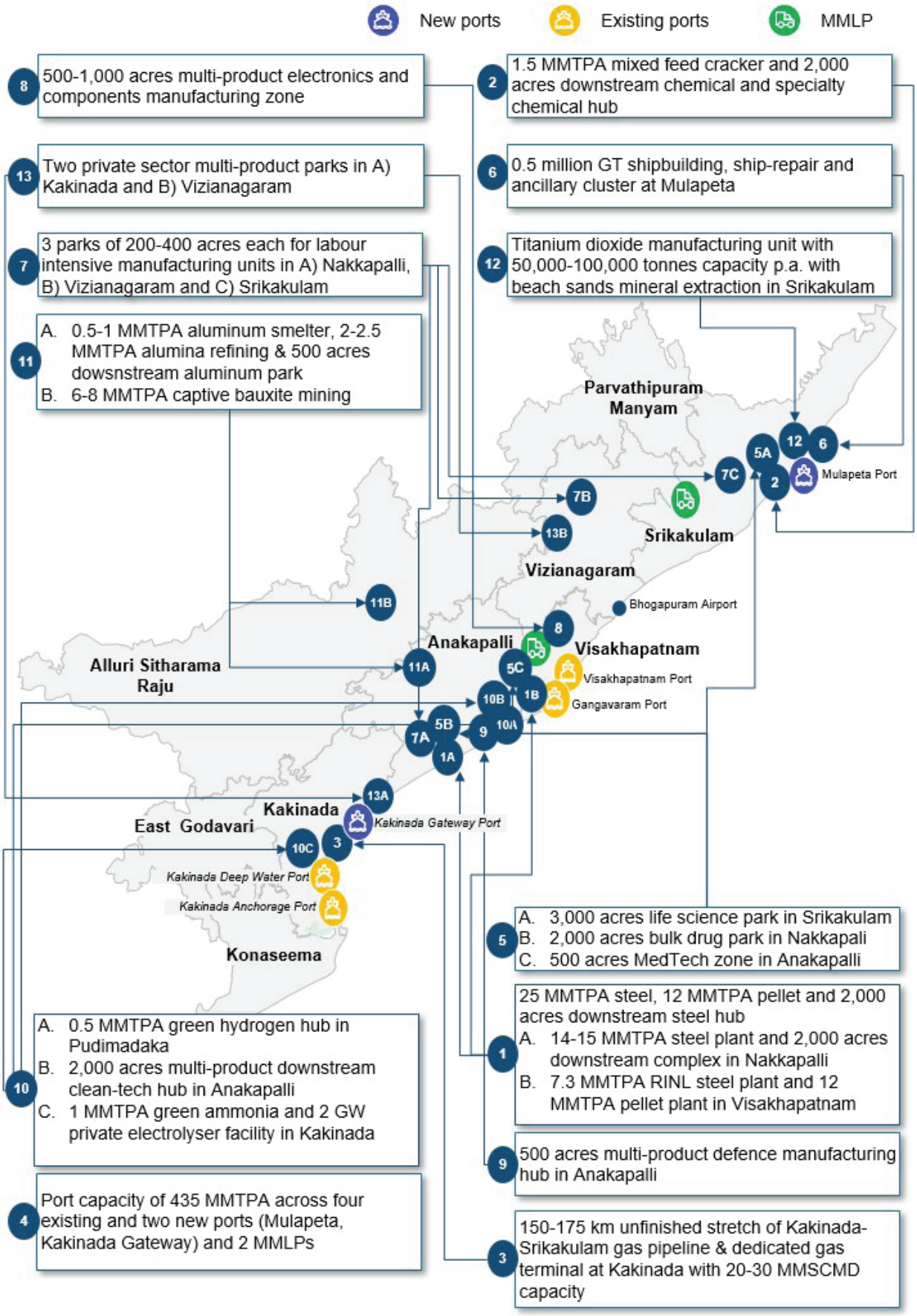
1. Land and geographical landscape

Developing these 10 manufacturing sub-sectors will require approximately 45,000-50,000 acres of land. This will lead to the creation of 12-15 manufacturing nodes across VER (as outlined in Figure 20).

Encouragingly, around 28,000-30,000 acres of land required for the development of these nodes is already allocated to projects or available with state government and its agencies. In addition to this, 5,500 acres of salt pan lands in Srikakulam are available with the Government of India. These will need to be transferred for the purpose of port and port-proximate industrial development.

The remaining 11,000-14,000 acres will need to be acquired/pooled. The land requirements and acquisitions/pooling required are explained in detail in the chapter 'Financing and land requirements'.

Figure 20: VER's 12-15 manufacturing nodes



2. Investments

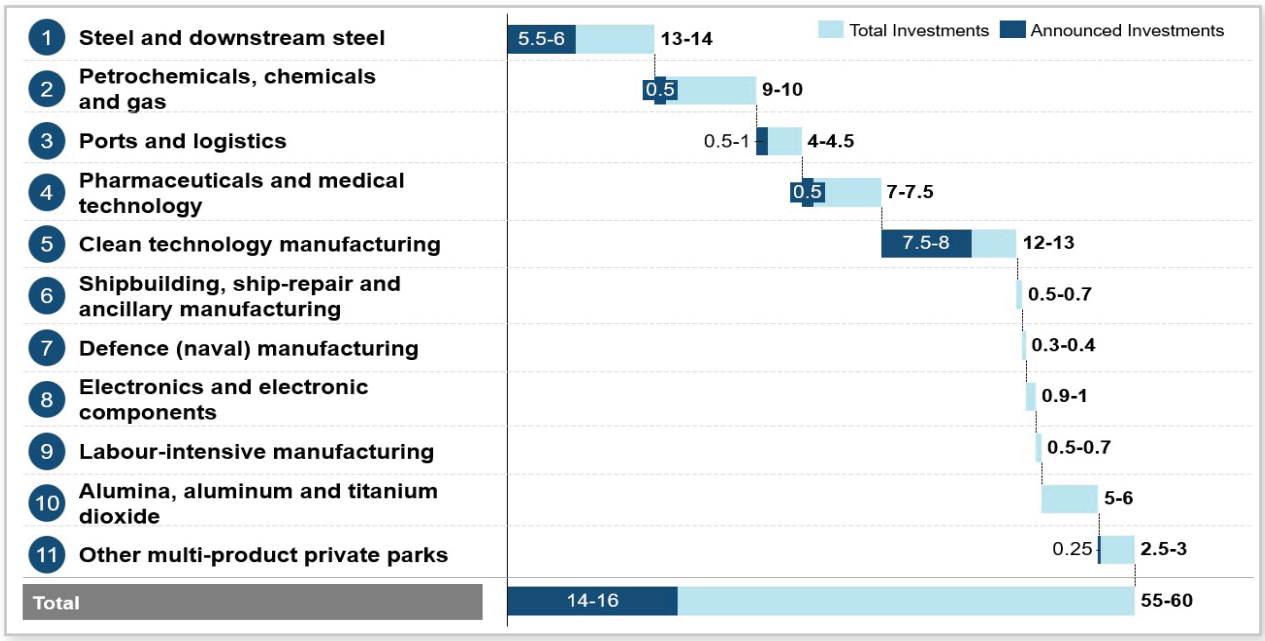
To materialise VER's port-proximate manufacturing aspirations, the region will need overall investments of $55-60 billion (Figure 21) as detailed below:

- 90-95% of the investments ($51-57 billion) will need to be attracted from the private sector (including central PSUs).
- The state agencies will need to invest $3-3.5 billion in NPV positive investments across land acquisition and the development of trunk infrastructure including roads, water, sewage and other utilities.

The good news is that investments of $14-16 billion for the sector have already been announced including the phase-1 development of the 14-15 MMTPA integrated steel plant, the 0.5 MMTPA green hydrogen hub and the phase-1 development of the Mulapeta port (23.5 MMTPA).

A deeper look on financing and investments has been provided in the 'Financing and land requirements' chapter.

Figure 21: Total investment required for port-proximate manufacturing ($ billion)



3. Policy architecture

VER will need to attract $51-57 billion from private sector investors to emerge as a global port-proximate manufacturing hub. To achieve this aspiration, a strong policy architecture with best-in-class incentives will need to be developed to facilitate investor attraction across the growth drivers, including:

- Anchor investor for the 1.5 MMTPA mixed-feed cracker

- National and international pharmaceutical majors for the 3,000 acres life-sciences and pharmaceutical cluster, 500 acres medical technology cluster and 2,000 acres bulk drug park
- Leading solar modules and electrolyser manufacturers for the 2,000 acres multi-product downstream clean-tech manufacturing hub
- Leading global shipbuilding players from established hubs like South Korea and Japan as well as ancillary manufacturing units for the new 0.5 million GT shipbuilding, ship-repair and ancillary manufacturing cluster
- Several large anchor investors that are capable of manufacturing both electronic components and finished white goods for the 500-1,000 acres multi-product plug-and-play electronics and components manufacturing zone
- Anchor investors for the aluminum smelter of 0.5-1 MMTPA capacity
- Anchor investor for beach sand mineral extraction and downstream titanium dioxide production
- Manufacturers for existing/ under-development private multi-product parks, including the 5,600 acres park in Kakinada, and the 1,000-1,200 acres park in Vizianagaram

VER benefits from Andhra Pradesh's robust policy architecture for port-proximate manufacturing with up-to-date policies, offering attractive incentives across emerging sectors such as clean-tech, defence, electronics, leather and footwear, as well as policies for the development of private industrial parks, logistics hubs, and the maritime sector.

This Economic Master Plan suggests the creation of 2 additional policies, with focused interventions poised to bring VER's manufacturing vision to life, including a dedicated shipbuilding and ship-repair policy and labour-intensive manufacturing policies for sub-sectors such as toys and furniture. The key requirements of these policies have been detailed in the chapter 'Projectisation, policies and institutional mandates'.

Growth Driver 2

Next-gen IT, data centre, AI and innovation hub

Context

India holds a unique position in the global IT industry. The nation's technology industry, encompassing IT services, business process management, software products, and hardware, was estimated to be over $250 billion in FY24,[44] accounting for only 5-6% of global IT revenue. However, with exports accounting for a majority of the sector's revenue, India is the world's largest outsourcing destination, commanding an estimated 59% share of the global IT services sourcing market.[45] Indian IT firms and Global Capability Centres (GCCs) have become integral to the fabric of Fortune 500 companies, making India a technology talent hub for the world.

The IT sector's fundamental importance to India's economy is evidenced by its significant contributions to the national economic aggregates as shown below:

- Contributed 7.8% to India's GVA (FY25)[46]
- Employed 5.8 million individuals (FY25)
- Led India's service sector exports with a 50% share (FY24)[47]

The outlook for India's IT sector remains robust, albeit with a note of cautious realism. NASSCOM's vision of $350 billion in annual revenue has been pushed from FY26 to around FY30, given recent slowdowns and global technological shifts. Achieving $350 billion by FY30 will require a steady growth rate of 6-8%.

Meeting these targets will require nurturing talent in emerging technologies, improving ease of doing business with simplified regulations and data policies, strengthening the innovation ecosystem, and marketing India's digital capabilities beyond being just a low-cost outsourcing destination.

The sector is already adapting to the changing global landscape. As traditional outsourcing work starts to automate, Indian companies have already pivoted to new high-value work. Nearly half of the incremental export growth in FY24 was driven by ER&D and R&D services as companies worldwide outsourced more cutting-edge engineering tasks to India.[48]

Government policies like 100% FDI in technology, special economic zones, and the new 'India AI Mission'[49] are designed to support these goals and sustain growth. Overall, India is expected to remain a growing IT ecosystem, further consolidating its share in global technology services.

Key trends shaping the industry

Shaped by disruptive technologies and shifting business needs, the global IT industry is evolving rapidly. Key trends that are expected to define the future of this sector are detailed in Figure 22.

Figure 22: 4 key trends shaping the IT industry

Global equity investments, 2024[50] | Global revenues, 2024[51]

Artificial intelligence is reshaping the IT landscape	**$125 billion** **$85 billion**	• From ML to Gen AI to proactive AI agents, the evolution of AI is fundamentally reshaping the IT landscape. GenAI in particular, has witnessed rapid surge in both investment and adoption. Since the release of ChatGPT in November 2022, investment flows into AI have increased nearly eightfold • The trend is expected to significantly alter the current ways of working. 30% of work hours could be automated by 2030[52]. Roles involving repetitive tasks (e.g. tele-callers, coders, QA/QC engineers etc.) are expected to be affected the most
Cloud computing and data centre expansion	**$81 billion** **$220 billion**	• Demand for data centre capacity is projected to almost triple by 2030[53]. While economies of scale will drive growth of hyperscale data centres, edge computing will simultaneously drive development of smaller centres closer to end-users for low-latency applications like IoT and AR/VR • Leading DC players plan to commit $1.8 trillion between 2024–30 to expand capacity, reflecting confidence in both enterprise workloads and the rapid rise of GenAI[54] • While the US remains the largest data centre market, high growth has been seen in Asia-Pacific (led by China and India), and secondary European markets, driven by data sovereignty and latency considerations
Cybersecurity	**$78 billion** **$160 billion**	• 3 of the top 10 global risks were identified to be technological: misinformation and disinformation; adverse outcomes of AI technologies; and cyber espionage and warfare[55] highlighting the increasing need for global digital trust and cybersecurity solutions • 77% of organisations expect an increase in their cybersecurity budgets to mitigate data breaches[56]
Robotics	**$7 billion** **$21 billion**	• Companies are investing heavily on robotics, with industries budgeting 25% of their capital expenditure between 2023-27 for these automation-related upgrades[57] • Retail and consumer goods companies are expected to become the leading investor in robotics over the next five years, with 23% of companies in the sector planning to invest more than $500 million

Figure 23: Impact of AI on technology jobs

While there's some debate, many experts believe that AI will have a net positive impact on the global job market, driving a significant reallocation of talent, rather than widespread unemployment. The World Economic Forum (WEF) projects that AI will generate 2 million incremental jobs between 2025-30 (11 million new jobs created while displacing 9 million jobs).[58]

Institutions worldwide have reinforced the view, noting that though AI will be associated with massive occupational transitions and gentler growth, it will not lead to a sharp decline, in overall employment.[59]

However, AI's impact on the IT and tech landscape will be a double-edged sword. While it is expected to create a net gain in jobs, it will also fundamentally reshape the ecosystem. This transformation is defined by two simultaneous forces: the automation of routine tasks (30% of current work hours)[60], which will lead to job displacement in some areas, and the creation of new, highly specialised AI-centric roles, which will require a new set of skills. The key roles that will be impacted are as shown below:

Top 10 redundant/ declining roles	Top 10 roles in high demand
• Entry level software developers	• AI/ML engineers
• Customer service representatives	• Data scientists/ big data specialists
• Graphic designers	• Cloud architects
• Data entry operators	• Data ethicists
• Software QA and testers	• Prompt engineers
• Technical writers / copy editors	• AI product managers
• Data analysts	• Cyber security experts
• IT support agents	• Compliance specialists
• Telemarketers	• AI/ML trainers
• Administrative/ office assistants	• Robotics engineers

WEF projects that nearly 40% of existing skill sets will become outdated between 2025 and 2030, highlighting an urgent need for upskilling. Sectoral experts in India have identified the following interventions necessary to create a future ready workforce:

- Short-term curricula updates to include electives in high demand fields such as AI, blockchain, data science, and cybersecurity
- Long-term overhaul to introduce new bachelor and master degree courses like B.Tech in AI and ML, B.Tech in Robotics, Masters in AI ethics etc.
- Creating a supportive policy framework that offers incentives for companies to invest in AI training
- Attraction of global talent and industry partners for curriculum design and deployment
- Free online, self-paced programs like "AI for All" by the Skill India Digital Hub, designed to demystify AI for the general public

IT hubs in India and VER's positioning

India's IT sector has been traditionally consolidated across 7 major hubs (Delhi-NCR, Mumbai, Bengaluru, Hyderabad, Chennai, Kolkata, and Pune). However, the growth of these mature hubs has started tapering due to rising costs of operations, low government incentives, highly stressed infrastructure and talent wars between companies. This has paved the way for emergence of new IT hubs across other cities. As of 2023, tier-2 cities accounted for 11-15% of the technology workforce.[61]

Visakhapatnam, poised strategically within this wave of dispersion, has already laid groundwork for its IT sector. The city's ecosystem currently draws strength from the 250 technology and BPM companies, collectively employing over 50,000 professionals and contributing $1.5-2 billion to the region's GVA. The region has also enabled AP to double its IT exports from $130 million in FY23 to $340 million in FY24.[62] VER's foundational appeal is strengthened by:

- Access to ready-to-move-in Grade-A office spaces
- Availability of a strong talent pool, graduating 25,000-30,000 technology professionals annually
- A competitive policy framework supported by innovative incentives
- Ongoing plans focused on enhancing infrastructure and connectivity

Key challenges hindering VER's growth

Despite strong initial momentum, VER's potential remains largely untapped due to several critical constraints, including:

Figure 24: Challenges limiting VER's potential to emerge as an IT and tech hub

Lack of social infrastructure	• Lack of vibrant social infrastructure needed to attract top-tier talent • Significant gaps in housing, modern entertainment, nightlife, dining and retail weaken VER's position as compared to urban hubs like Bangalore, Hyderabad and Pune
Low utilisation of existing IT parks	• Of the 580+ acres earmarked for IT development in Madhurawada, less than half the land has been developed and only 77% of that developed area is currently occupied[63] • High real estate costs have emerged as a key bottleneck preventing utilisation
Regulatory delays	• Delays in project-related clearances including approvals for setting up and expanding IT facilities, allotment of incentives, and issuance of required compliance certificates have been cited as key challenges by existing developers working in the region

Limited connectivity	• Inadequate inter- and intra-city connectivity to major IT hubs, with limited access to efficient metro, bus and feeder services • Weak international connectivity making VER less attractive for global clients and IT investors

Aspiration for VER

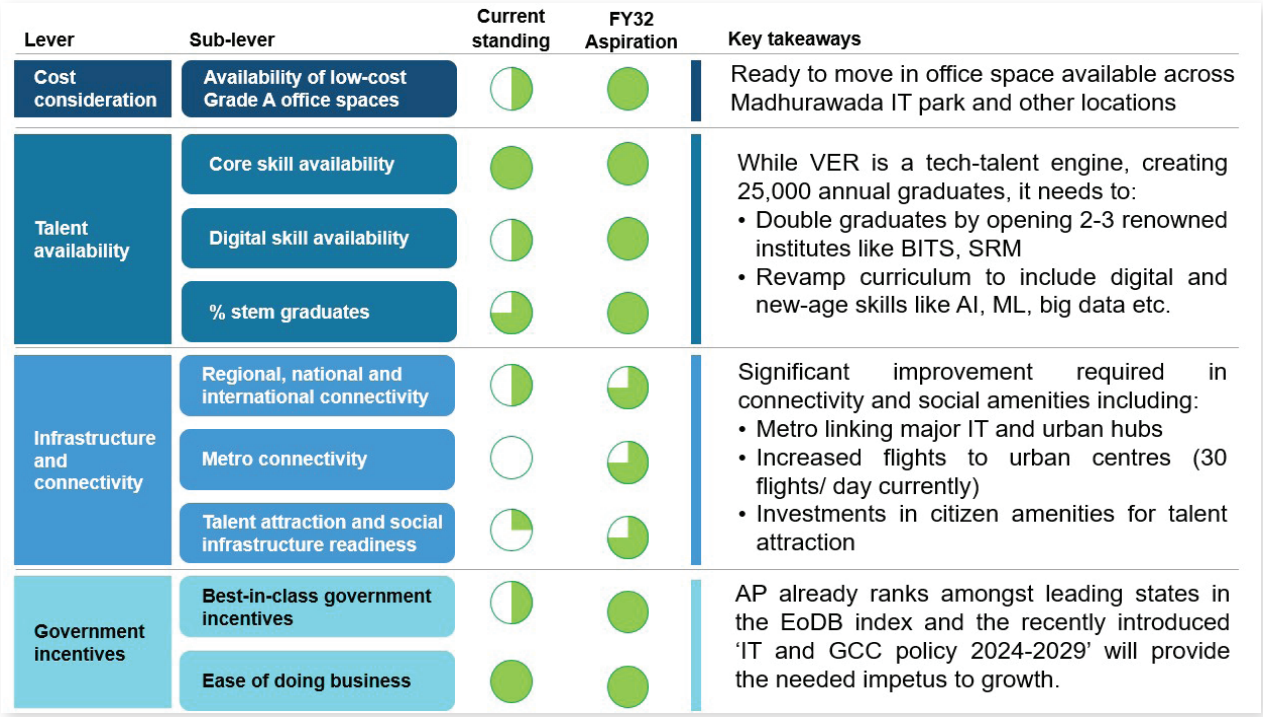
VER holds the potential to become one of India's most competitive, emerging information and technology destination by FY32. By attracting 1) IT firms 2) data centres 3) startups and 4) Global Capability Centres (GCC), VER can aspire to increase the sector's GVA from $1.5-2 billion in FY23 to $10-12 billion by FY32, while creating nearly 400,000-425,000 incremental jobs. Figure 25 highlights the significant shifts in KPIs required to achieve VER's vision:

Figure 25: Key KPIs for IT and tech hub

	From (FY23)	To (FY32)
IT GVA (In $ billion)	1.5-2	10-12
Area under IT and data centre parks (In acres)	580+	1,500-2,000
Total sectoral jobs (In 000)	50+	450-475
Annual technology graduates	25,000-30,000	45,000-50,000
Annual management graduates	5,500	7,500
Data centre capacity	-	2.5 GW
Number of GCCs	<5	60-80
Number of startups	400-500	5,000

Figure 26 illustrates VER's current standing and interventions required across 9 key parameters to emerge as a best-in-class IT ecosystem.

Figure 26: VER's current standing and FY32 aspirations for IT



Proposed interventions to achieve VER's aspiration

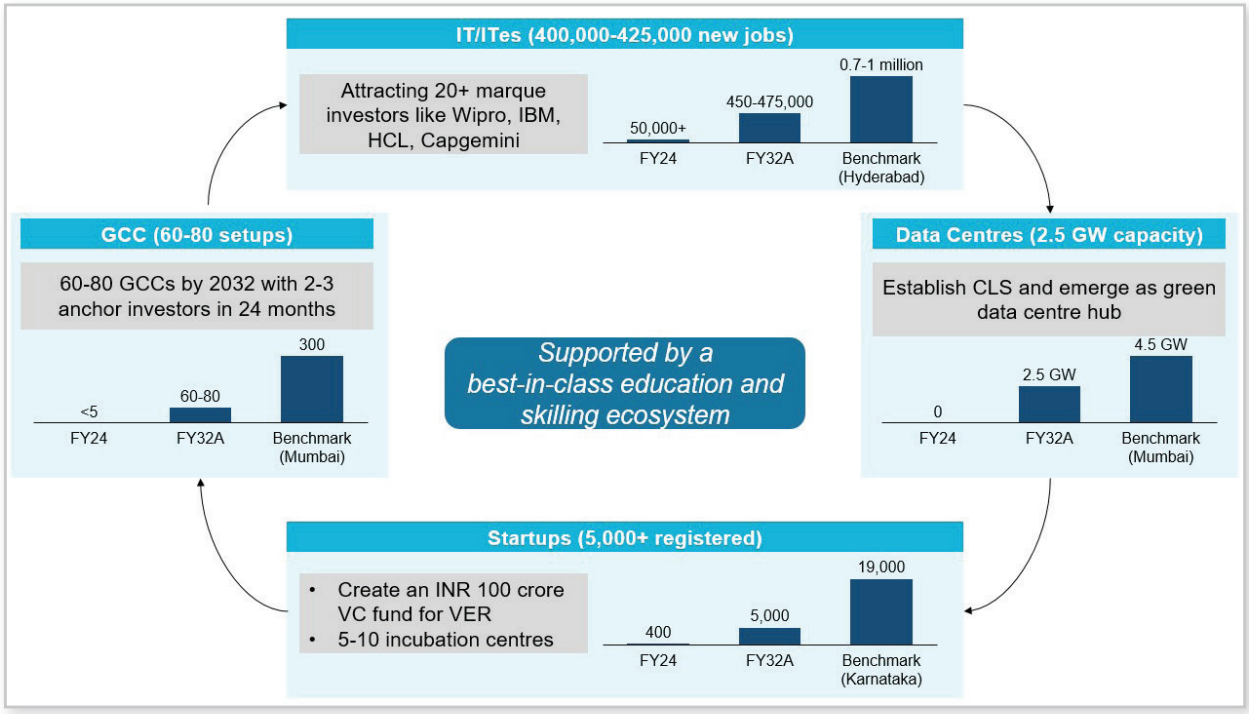
Achieving these ambitious aspirations calls for several targeted interventions to establish a robust and synergistic ecosystem across the foundational segments detailed below:

- **IT services:** Attracting 20+ marquee investors and creating integrated mixed-use IT parks with lower real estate costs to emerge as India's next IT hub of choice
- **AI and data centres:** Emerging as India's top 3 data centre hubs with 2.5 GW capacity by FY32, enabled through a proximate cable landing station and availability of green energy sources
- **Startup and innovation ecosystem:** Increasing DPIIT registered startups from 400-500 currently to over 5,000 in FY32, by creating an enabling incubation, investment and regulatory framework
- **GCCs:** Attracting and operationalising 60-80 GCCs by FY32 by focusing on emerging trends and VER's strengths across areas such as pharmaceuticals, medical devices, ship-building and ports
- **Skilling interventions:** Attracting 2-3 tier-1 universities, revamping curricula to include new-age degree programs and courses (as identified in Figure 23) to create a future ready workforce, and forging partnerships with industrial and finishing schools to ensure continual upskilling of existing talent base

- **Connectivity and social infrastructure:** Enhancing international, national, and regional connectivity by leveraging planned and proposed projects like the Bhogapuram international airport, Visakhapatnam metro, planned and proposed highways etc. while improving social infrastructure to attract and retain top talent
- **Investments and policy incentives:** Secure $15-20 billion in investments by FY32 through targeted policy and EoDB interventions

To achieve this aspiration, VER must create an integrated 'IT-Innovation-Data Centre-GCC' corridor across Madhurawada, Kapuluppada, Anandapuram and other regions identified, supported by proactive government facilitation, Cable Landing Station (CLS) connectivity, and Grade A urban infrastructure availability. If VER is able to trigger a virtuous cycle of IT, data centre and startup growth, it will further attract the GCC ecosystem to set up operations in the region as shown in Figure 27.

Figure 27: Virtuous cycle ecosystem of IT, data centres, startups, and GCCs



The following section details the targeted interventions required to position VER as a leading IT destination.

1. India's emerging IT destination of choice

Visakhapatnam has already laid the groundwork for its IT sector. The city draws strength from over 250 technology and BPM companies, collectively employing over 50,000 professionals. The region has also been a key contributor to the state's IT exports, increasing them from $130 million in FY23 to $340 million in FY24.[63]

Interestingly, there is active growth momentum in the region with leading IT companies committing to nearly 200,000 jobs in the region by 2027-28.

Key challenges

The city's ability to sustain its growth trajectory is contingent on its capacity to overcome several key challenges including:

- **Underutilised infrastructure:** Of the 580+ acres earmarked for IT, less than half of the designated land has been developed. Further, only 77% of that developed area has been occupied
- **Talent deficit due to out-migration:** Despite being an IT talent hub producing 25,000-30,000 technology graduates annually, the city faces a talent deficit due to the persistent out-migration of talent to major hubs like Hyderabad and Bangalore
- **Undeveloped social infrastructure:** The city lacks urban infrastructure and citizen amenities like housing options, entertainment ecosystem, retail complexes etc. which are essential for attracting and retaining a skilled, mobile workforce

Proposed interventions to achieve VER's aspiration

To realise its full potential, VER must strategically address these challenges with a clear action plan. The following initiatives are critical to cement Visakhapatnam city's position as an emerging IT hub of choice:

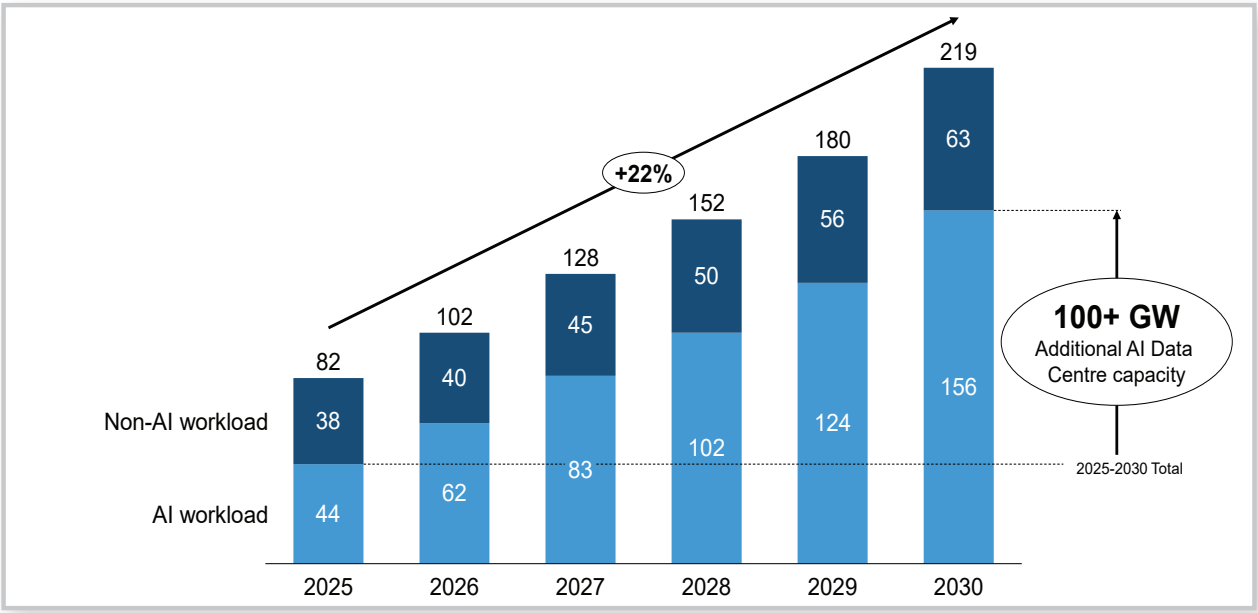
1. **Attracting and retaining key players:**
   - **Operationalise commitments:** Ensure the 200,000 seat commitment from existing anchor players is fully operationalised within the next 18-24 months
   - **Secure anchor investors:** Target 15-20 new IT majors to establish campuses in Visakhapatnam, committing 15,000-20,000 jobs each
   - **Incentivise existing firms:** Provide targeted incentives to 5-8 existing firms with limited footprint to encourage expansion within the next 12 months
2. **Development of two additional plug & play parks:** Establish two new integrated IT and data centre parks at Kapuluppada and Anandapuram by 2028-29. These hubs should be developed as mixed-use zones with best-in-class social infrastructure, including residential complexes, commercial establishments, and entertainment zones
3. **Improving regional connectivity through Visakhapatnam Metro:** Ensure the metro's Right of Way (ROW) for both phases is located within a 1-2 km radius of all IT hubs and expedite completion by 2028-30
4. **Develop social infrastructure:** Prioritise creating a vibrant social and entertainment ecosystem, including diverse dining options, nightlife, and recreational facilities to attract and retain young talent

5. **Increase technology graduates skilled in new-age disciplines:** Establish 2-3 top global universities and expanding seats in existing colleges for new course offerings to increase annual technology graduates to 45,000-50,000

2. Emerging as one of India's top 3 data centre hubs

Driven by increasing demand from AI workloads, cloud adoption, streaming services, and edge computing, global DC capacity is set to experience explosive growth. The market is projected to expand 2.7 times, from 82 GW in 2025 to 219 GW by 2030. AI is expected to be the leading driver of DC capacity, accounting for an overwhelming 124 GW of the incremental capacity over this five-year period as shown in Figure 28.[64]

Figure 28: Global data centre capacity projections (in GW)



India currently handles 2% of the world's data centre capacity (1.2 GW) and has CLS setups in five cities. With focused investments and infrastructure expansion, it has the potential to scale its capacity to 17 GW positioning itself to capture 5-10% of the global data centre capacity by 2030.[65]

Andhra Pradesh's data centre market remains at a nascent stage, with a single 300 MW facility. However, in response to the rising demand for data storage, the state government has introduced the Andhra Pradesh Data Centre Policy (4.0) 2024-29. This forward-looking policy is designed to strategically attract investment into advanced, AI-enabled data centres and position the state as a preferred destination for large-scale data embassies and parks.

Additionally, the state's extensive coastline and favourable geographical location provides dual benefits:

- Proximity to international submarine cable networks, ensures high-speed, low-latency data connectivity

- Potential to utilise natural cooling solutions (such as seawater-based systems), provide opportunity to improve energy efficiency and promote sustainable and green data centre operations

These strategic advantages, combined with best-in-class policy investments and the proposed CLS in Visakhapatnam, have already proven to be key catalysts. The city has secured commitments from marquee investors, including Google, which has committed to establish its first India-based AI hub in Visakhapatnam. This ambitious project will entail creation of a gigwatt-scale data centre in the city by 2030. With these strategic commitments, Visakhapatnam is well-positioned to become a premier green data centre hub. The city has the potential to develop at least 2-2.5 GW of operational data centre capacity which could contribute an estimated $3-4 billion to VER's GVA by FY32.

Proposed interventions to achieve VER's aspiration

To realise this ambitious growth, the following critical enablers are required:

1. **Ensure realisation of announced investments:** With commitments for creation of 1-1.5 GW of data centre capacity in the region already announced (Google, other smaller edge centres), it would be crucial to ensure timely realisation of these commitments to meet the FY32 aspiration
2. **Establish a CLS:** To catalyse data centre and digital infrastructure growth, Andhra Pradesh's first CLS must be identified, anchored, and operationalised in Visakhapatnam within 24 months
3. **Ensure reliable utilities and green energy infrastructure:** To meet this aspiration, the region should provision for an additional 40-50 MLD of water and 2-2.5 GW of power capacity with a high-renewable energy share. Further, dual-grid connectivity should be enabled to guarantee uninterrupted and scalable services for the digital infrastructure
4. **Create plug-and-play infrastructure:** Expedite the creation of dedicated plug-and-play zones for data centre development within the under-construction IT park in Madhurawada and the two IT and data centre parks proposed in Kapuluppada, and Anandapuram as part of this Economic Master Plan
5. **Additional policy incentives:** To attract further investment, the state could introduce additional incentives, including an electricity tax subsidy and a green power tariff reimbursement, mirroring successful policies implemented in states with an established capacity such as Karnataka and Tamil Nadu

3. Strong startup and innovation ecosystem

India's startup ecosystem currently ranks third globally (after US and UK) and has contributed 10-15% to India's GDP growth story between FY16-FY23.[66] Although many new-age innovations are still in their early stages, they offer significant growth potential and are poised to play a vital role in boosting India's GDP in the years to come.

AP currently hosts 2,400 DPIIT-registered startups. VER accounts for approximately 17% (around 400) of these startups with a heavy focus on IT, engineering, and edtech, and is home to 17 incubators/accelerators. The region currently ranks 24th nationally as per the preferred destinations for start-up incubation in India rankings.

VER should aspire to be among the top 10 destinations for start-up innovation and incubation in India and aim to have over 5,000 registered startups by FY32. This objective will be achieved by leveraging the region's foundational strengths in domains such as logistics, med-tech, pharmaceuticals, education, and agriculture, while proactively driving innovation in high-growth areas like Industry 4.0, AI, cybersecurity, robotics, and AR/VR proactively.

Proposed interventions to achieve VER's aspiration

To enable this growth, the city region should undertake the following key steps:

1. **Fund establishment:** Earmarking a ₹100 crore Fund of Funds (FoF), privately managed by a state managed AMC to invest in 3-4 key strategic thematic areas, drawing inspiration from successful regional funds such as the KITVEN fund in Karnataka
2. **Ecosystem amplification:** The city region should double its innovation ecosystem from 17 to a target of 30-35 incubators, accelerators, and Centres of Excellence (COEs) by FY32 to support startup growth. This can be achieved by:
   - **Establishing incubation centres:** Create 5-10 centralised hubs offering shared infrastructure and enabling resource sharing. They should be strategically located in key urban centres like Visakhapatnam and Vizianagaram. Interestingly, two spokes of the Ratan Tata Innovation hub are already being planned in the region. By creating 5-10 such centres, VER would have the potential to incubate 3,000+ startups through these centralised hubs
   - **Creating dedicated R&D COEs:** Master plan new cities and zones to include dedicated space for sector specific R&D COEs. Strategically co-locating these centres such as a MedTech COE in MedTech Zone 2.0 and a logistics COE near the Visakhapatnam Port will maximise the impact of shared facilities and industry-specific funding
3. **Policy support:** Provide targeted financial incentives in line with the Andhra Pradesh Startup and Innovation Policy 4.0, including subsidies for rent and interest, incubator grants, and support for capital infrastructure development costs
4. **Innovation hub creation:** Develop a 150-acre dedicated education and innovation hub with 5+ nationally renowned universities/colleges, forming a dynamic innovation cluster akin to the one in Boston

4. Destination of choice for GCCs

India accounts for over 50% of the global GCC market with about 1600+ GCCs in the region and is expected to reach 3,000-3,200 GCCs by 2030.[67]

The growth and competitiveness of GCCs are intrinsically linked to the strength of a region's IT services. GCCs are normally "followers" and invest when there is already a robust ecosystem including critical mass of digitally skilled professionals, robust innovation ecosystems, and a high concentration of technology-driven enterprises.

With the IT, data centre and innovation infrastructure development planned, VER can target to achieve a 2% share of GCCs in India by volume, aspiring to have 60-80 setups in the region by FY32. The GCCs should focus on innovative tech capabilities (such as AI/ML, data analytics, Robotic Process Automation, cloud and ER&D) and the region's legacy strengths (such as pharmaceuticals, medical technology and ports and logistics).

5. Best-in-class skilling ecosystem

VER faces a critical talent gap, as its large graduate pool does not meet the demands of the modern job market. The region's 96 engineering colleges graduate 25,000-30,000 B.Tech students annually, but the existing curriculum is outdated and fails to prepare them for the rapidly evolving technology landscape. The disconnect between academia and industry has resulted in a workforce that, while highly credentialed, lacks essential vocational, digital, and soft skills needed for employment in emerging fields like AI, ML, cloud, cybersecurity and robotics.

Proposed interventions to achieve VER's aspiration

To achieve the aspiration to emerge as a leading technology and innovation hub, VER must build a steady pipeline of 45,000-50,000 job-ready B.Tech. graduates by FY32 by prioritising the following initiatives:

1. **Attract marquee institutions:** Attract 2-3 reputed national technology universities (e.g., IIT, NIT, SRM, BITS) and 1-2 top-tier management institutes (e.g., ISB, XLRI) to strengthen the region's technology and management graduate pipeline
2. **Curriculum upgrades:** Introduce the 15 NASSCOM-recommended electives across high-demand fields such as AI, blockchain, data science, and cybersecurity across all graduate colleges
3. **Industry partnerships & finishing schools:** Institutionalise finishing school programs in 15+ leading colleges through corporate tie-ups (such as Academic Interface, TCS and Campus Connect, Infosys) to boost placement readiness
4. **Knowledge city hub:** Develop the proposed 150-acre knowledge city as a central hub for education, upskilling, world-class research and innovation
5. **Interdisciplinary AI programs:** Introduce dedicated AI and data science tracks within existing curricula, supplemented by short-term electives and free online programs. Further, the government can allocate funds in challenge mode for establishing AI labs in 10-15 colleges by tapping centrally funded schemes

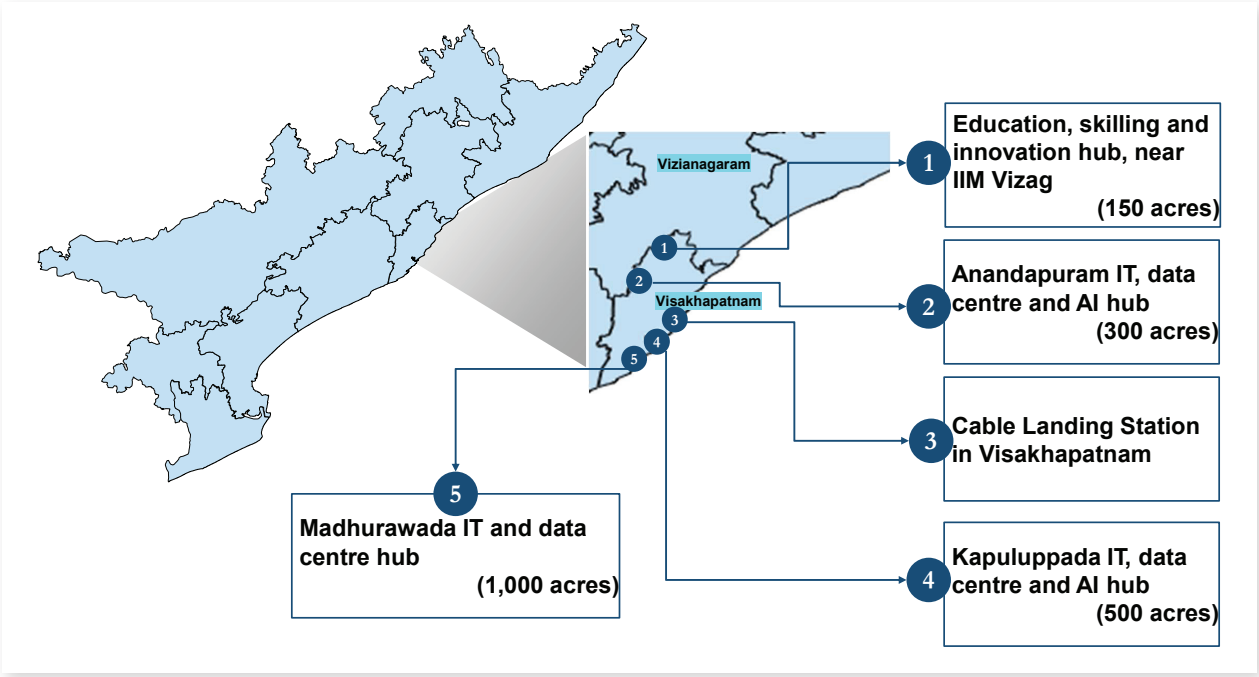
Land, investments and policy architecture

1. Land and geographical landscape

The shift towards work-from-home and hybrid work models actively supported by the Andhra Pradesh IT Policy has significantly reduced the need for large-scale land development traditionally associated with IT infrastructure. Instead of building massive office campuses, the focus is now on developing flexible, distributed work ecosystems. In this context, the state already has a strong starting point with 580+ acres of land in Madhurawada developed as an IT park.

To meet future requirements and support the growth of new IT hubs, an additional 1,000-1,500 acres of land will be required. Kapuluppada and Anandapuram have been identified as high-potential zones within the region. Additionally, area near IIM Visakhapatnam has been envisioned to be developed as an education, skilling and innovation hub of 150 acres as shown in Figure 29.

Figure 29: Key IT and innovation hubs



2. Investments

To realise its ambitious goals, VER needs a total investment of $15-20 billion. Over 90% of this investment would need to be attracted from private sector players and will be directed towards the below mentioned developments:

1. **Data centres ($10-15 billion):** To emerge as a leading data centre hub with 2.5 GW capacity, VER would need to attract $10-15 billion in investments. This will include

all developments (building, IT hardware and crucial cooling systems) except the investments required for power infrastructure. Interestingly, the region has already secured a foundational, market-defining commitment from Google for the development of India's first gigawatt-scale data centre and a new international subsea gateway in Visakhapatnam. Beyond this, additional investments of $3-5 billion need to be attracted for the rest of the data centre capacity

2. **IT Parks and innovation hub ($1.5-2 billion):** To accommodate growth, VER will need to attract an additional $1.5-2 billion in investment for the development of new IT parks to bring the total footprint of the IT hubs to over 1,500 acres, including the existing 584 acres at Madhurawada
3. **Startups and Innovation ($2.5-3 billion):** To further strengthen the ecosystem, an estimated $2.5-3 billion investment would be required for the sector including over $1 billion for skilling initiatives and $1.5-2 billion VC investment to support the aspiration of building a strong startup ecosystem

3. Policy architecture

It is essential to establish forward looking operating guidelines to attract investments, and substantially step-up the IT department to increase the Ease of Doing Business (EoDB) to position VER as a premier IT and innovation hub. Setting up a Fund of Fund (FoF) with a ₹100 crore corpus for VER, managed by an independent asset management company will be required to boost innovation in the region. These interventions are further detailed in the chapter 'Projectisation, policies and institutional mandates'.

Growth Driver 3

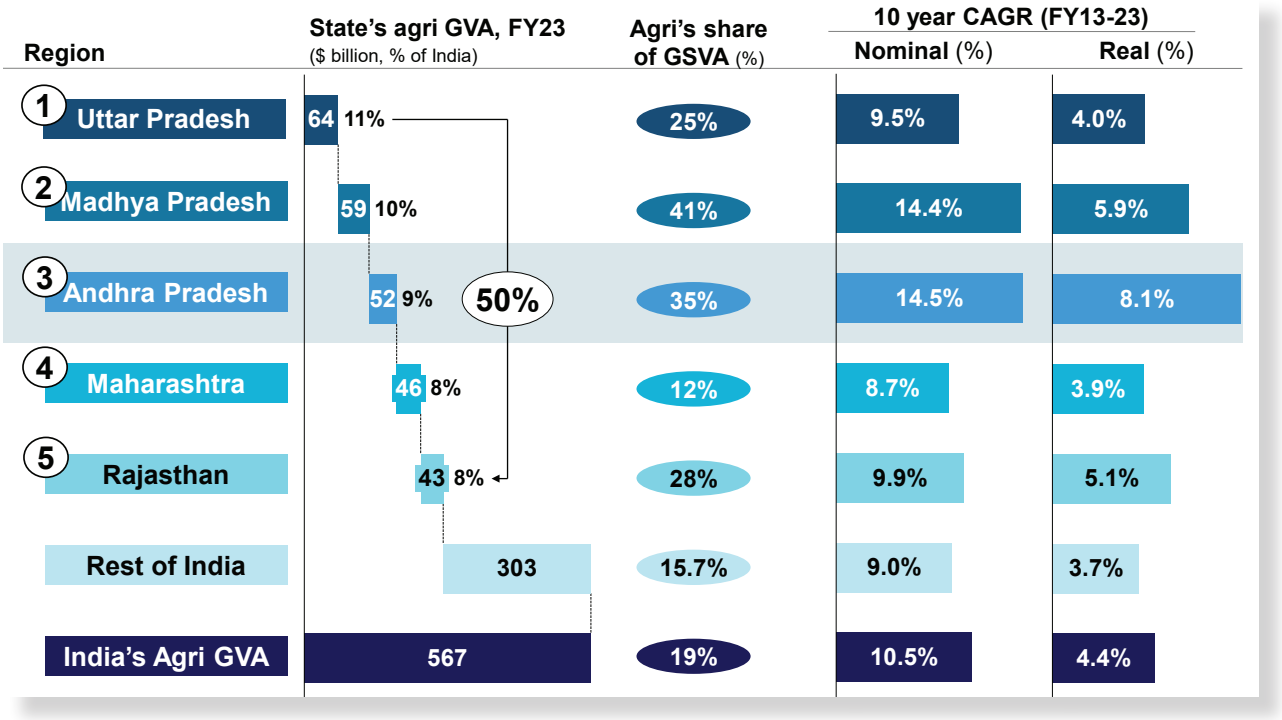
Global agriculture leader

Context

Andhra Pradesh is a leading agrarian state, ranking as the third-largest contributor to India's agricultural sector with a $52 billion GVA and 10% share in FY23.[68] Within the state's economy, agriculture stands out as the fastest-growing sector, recording a robust real CAGR of 8.1% (14.5% nominal) over the past decade, notably surpassing the state's growth rates in manufacturing and services.[69] This high-speed growth makes Andhra Pradesh one of the fastest growing agrarian states.

Figure 30 shows a comparison of the top 5 contributors to India's agricultural GVA. Next only to Madhya Pradesh (41%), 35% of Andhra Pradesh's GVA comes from agriculture and allied activities, underscoring the strategic importance of the sector for the state's future economic growth.

Figure 30: Comparison of GVA and growth rate of top 5 agriculture states

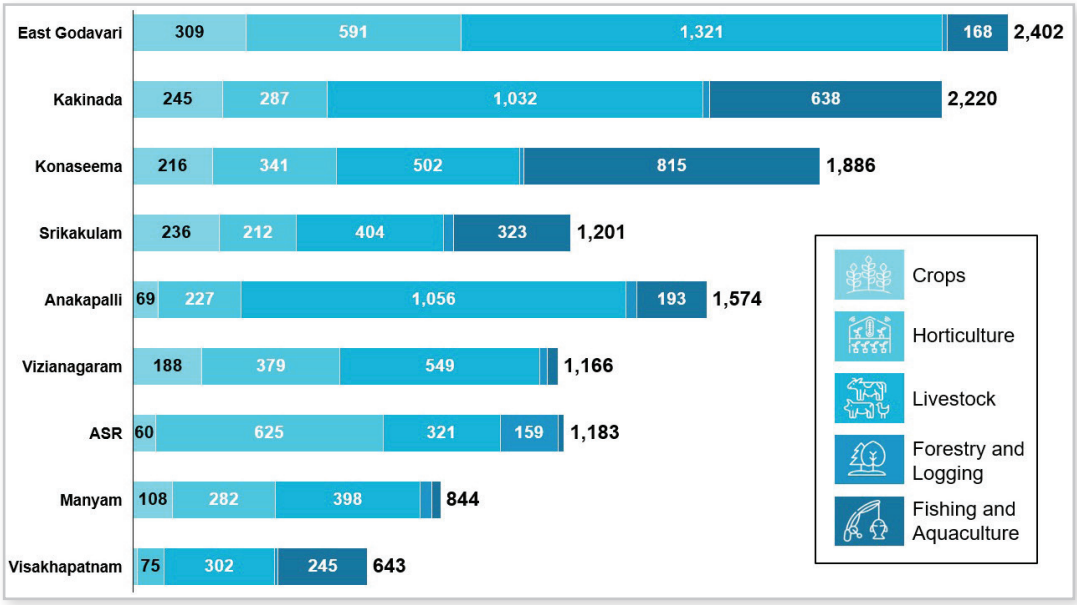


It is interesting to note that while crops account for 76% of Madhya Pradesh's agriculture GVA, they contribute only 40% to AP's agricultural GVA. This highlights the state's robust and diversified agrarian landscape, distinguished by steep contributions from aquaculture and capture fisheries (24%) and livestock (32%) segments, making it the largest fisheries and the third largest livestock producing state in the country.

VER accounted for $13.1 billion (24%) of the state's agriculture GVA in FY24. The geographically blessed districts of East Godavari, Kakinada and Dr. B.R. Ambedkar Konaseema, lying within the highly fertile Godavari delta, collectively led VER's agricultural output, contributing over 50% to the sector's GVA. Within this cluster, East Godavari

delivered the highest GVA contribution in FY24 ($2.4 billion), followed by Kakinada ($2.2 billion) and Dr. B.R. Ambedkar Konaseema ($1.9 billion). In these districts, livestock emerges as the major sub-sector, followed by horticulture and fisheries. Agriculture is also the key economic activity in the tribal districts of ASR and Parvathipuram Manyam, providing livelihood to nearly half the population.

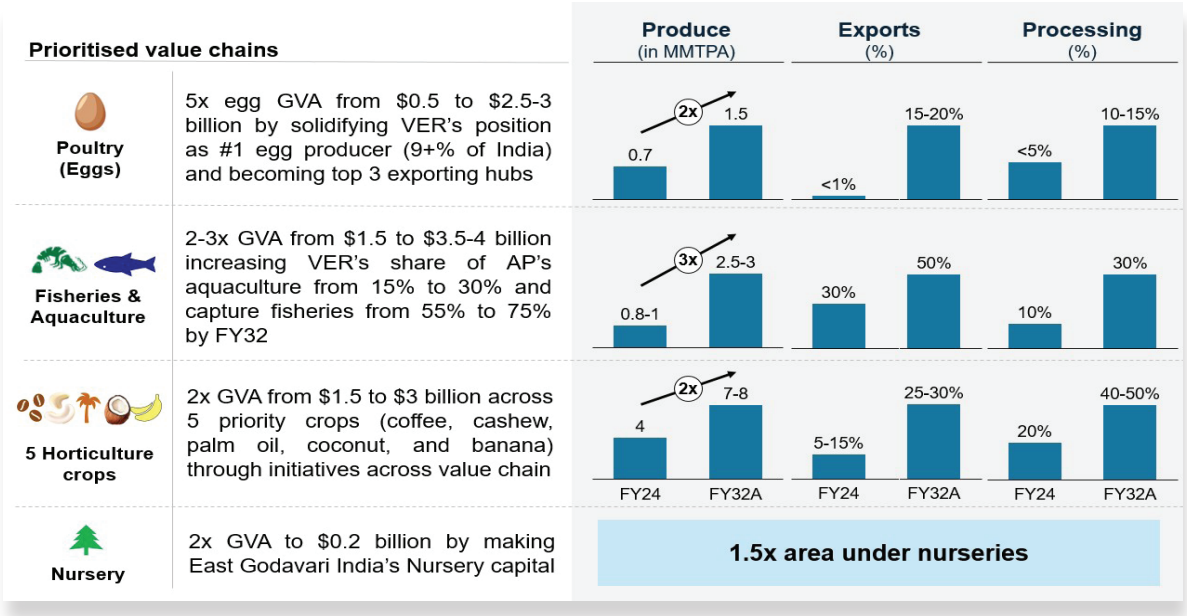
Figure 31: Sub-sector wise agriculture GDVA, FY24 (in $ million)



Aspiration for VER

This master plan aspires to make VER a national and international leader in eggs, fisheries, 5 prioritised horticulture value chains and nurseries to unlock $5-7 billion in incremental GVA by FY32 and create 100,000-125,000 new jobs. Figure 32 highlights the significant shifts in KPIs required to achieve VER's vision:

Figure 32: Key performance targets for agriculture and allied sectors



Proposed interventions to achieve VER's aspiration

To emerge as a national and international leader in agriculture, VER will focus on expanding area under cultivation, while adopting an integrated end-to-end value chain approach. This will involve improvements in productivity, processing and market linkages across the prioritised value chains. This section details four such value chains, the challenges they face, and the specific interventions required to achieve VER's aspiration for FY32:

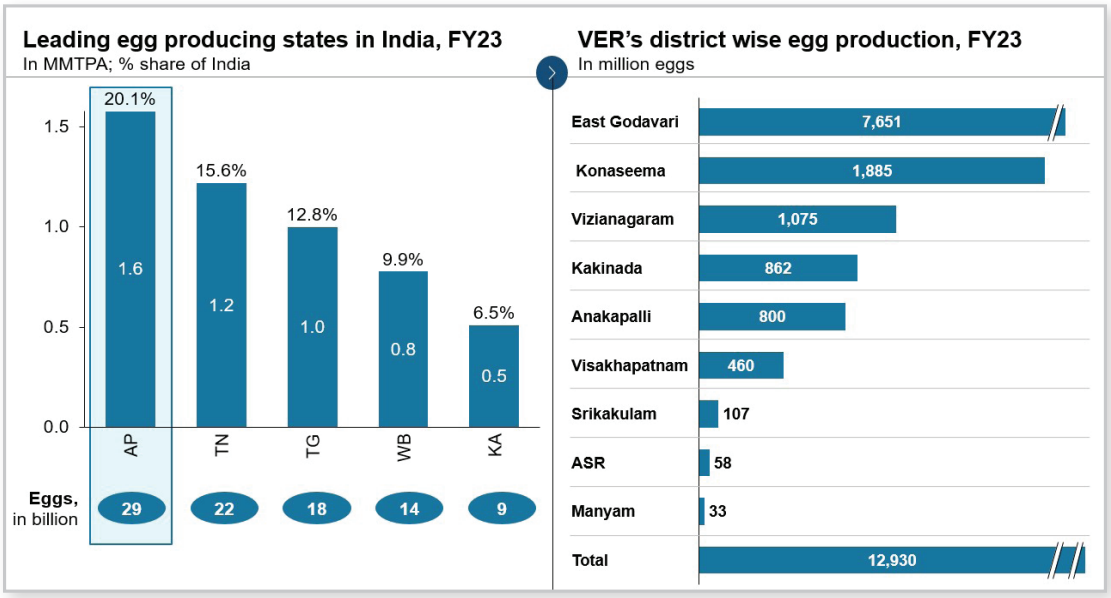
Figure 33: 4 focus areas for VER agriculture

1	2	3	4
Retaining international leadership in egg production and becoming global export hub	Solidifying VERs position as leading aquaculture and capture fisheries producer, processor and exporter	Driving cluster-based development of 5 prioritised horticulture value chains	Consolidating East Godavari's position as nursery capital of India with global export capability

1. International leadership in egg production

Globally, 88 MMTPA (1.6 trillion)[70] eggs were produced in 2023 and production is expected to reach 115 MMTPA (2.1 trillion) by FY32. India is the second largest egg producer after China, contributing 9% to the global output (8-9 MMTPA or 145-165 billion eggs). Andhra Pradesh remains the largest egg-producing state in India, accounting for 20% of the national output (1.6 MMTPA or 29 billion eggs) as shown in Figure 34.[71] However, this dominance has been steadily declining from the peak 33% share a decade ago, highlighting an urgent need for strategic interventions to retain its leadership.

Figure 34: Egg production in AP and VER



VER is the state's egg producing nucleus. Nearly 1 out of 2 eggs produced in the state are from VER. East Godavari alone produces over 60% of the region's eggs (7.6 billion),[72] followed by Dr. B.R. Ambedkar Konaseema (1.8 billion).

Aspiration for VER

VER should aspire to increase its egg production GVA from $0.5 billion as per FY24 estimates to $2.5-3 billion by FY32. Figure 35 highlights the significant shifts in KPIs required to achieve VER's vision.

Figure 35: KPIs for egg production

	From (FY24)	To (FY32)
Number of hens (in million)	45-50	80+
Yield (egg/hen/year)	236	300
Eggs produced (in billion)	13-14	25-30
Production (in MMTPA)	0.7-0.8	1.5
Processing (%)	<5%	10-15%
Exports (%)	<1%	15-20%
Farm automation (%)	<5%	30%
Weight per egg (in grams)	55-60	60-65

Key challenges

Four key bottlenecks that are hindering egg production, their transformation into higher-value products, and limiting market access include:

1. **Suboptimal productivity:** Despite being a major egg producing hub, the productivity in VER (236 eggs/hen/per annum) is significantly lower than global standards (340 eggs/hen/annum) due to:
   - **Poor feed conversion ratio (FCR):** The FCR is much higher at 2-2.2 kg vs. global average of 1.8 kg due to the widespread use of mash feed instead of crumbled feed
   - **Limited access to high-yield breeds:** Use of poor-quality parent stock in layer breeding programs results in 10-15% lower productivity and 8-10% lower survival rates

- **Reliance on traditional methodologies:** 90% farms have not upgraded to modern, efficiency-driving technologies like automated feeders and climate control systems
- **Weak biosecurity and high mortality:** Inadequate biosecurity increases the risk of disease outbreaks, which can spread rapidly and lead to significant economic losses. This results in a high mortality rate among hens, reducing the overall flock size and increasing the costs of replacing birds, further impacting farm profitability. For instance, in early 2025, Andhra Pradesh experienced a severe avian influenza outbreak (H5N1) causing the death of 1.2 million birds in East Godavari, with significant losses reported in Undrajavaram and Peravali mandals

2. **Untapped export potential:** India exported $82.4 million worth of eggs in 2023, ranking 13th with a 1.4% share of global exports.[73] Interestingly, over 95% of India's exports originate from the Namakkal-Chennai belt in Tamil Nadu, widely recognised as the "Egg City" of India.[74] Despite VER's strong production base and domestic movement of eggs to other states, its contribution to India's international egg exports through the state's ports is under 1%. This underperformance is driven by factors including:
   - **Subpar quality of eggs:** VER's eggs fall short of the premium grade required for international markets. They are typically smaller (averaging 55 grams compared to the international standard of 60-70 grams), and have inconsistent shell strength and yolk colour, leading to shorter shelf life
   - **Lack of critical infrastructure:** VER lacks facilities for grading, certification, and cold chain management and the region is thus unable to meet export standards. Consequently, the region functions as a supplier of raw eggs to other developed ecosystems, such as Chennai, which then capture the value-added benefits of exporting. For instance, when export demand increased sharply during the 2023 Malaysia shortage, producers/exporters in Tamil Nadu were able to rapidly mobilise over 50 million eggs, demonstrating the importance of an integrated export ecosystem
3. **Ageing workforce and lack of successors:** The next generation in VER, particularly in non-tribal districts is steadily moving away from poultry farming. As per regional experts, 30-40% of existing farms in VER could shut down over the next 5-7 years as aging farmers exit without successors. If left unaddressed, VER's share in national egg production could decline from 9% currently to 6% by FY32
4. **Processing:** Most of VER's current production in is left in its raw form, with less than 5% undergoing processing. The ecosystem lacks both primary and secondary processing infrastructure such as automated grading, uniform sizing, cold chain, and packaging. Globally, best practices in egg processing include UV sanitisation, automated weight-based grading, oil coating for extended shelf life and conversion to value-added forms like egg powder for baking

Proposed interventions to achieve VER's aspiration

1. Enhance production and productivity

- Support the creation of 700 new-age poultry farms through capital subsidies, training, and market linkages, with a focused rollout in tribal districts like ASR and Parvathipuram Manyam to navigate anticipated demographic challenges such as an ageing farming workforce and limited next-generation participation
- Establish 10 state-of-the-art hatcheries through private sector partnerships to ensure adequate supply of quality chicks
- Promote the use of crumbled feed instead of mash feed to improve Food Conversion Ratio (FCR), as crumbled feed is more uniform, easier to digest, and leads to better nutrient absorption leading to faster weight gain
- Target 30% farm automation by providing capital subsidies for farm modernisation and upgradation to climate-controlled technologies, conveyor-based systems etc.
- Establish a research centre like ICAR-CARI in East Godavari, to improve the genetic quality and disease resistance of birds

2. Increase share of eggs processed to 10-15%

- Develop a 200 acres multi-product secondary food processing park in Vizianagaram, anchored by 2-3 marque investors to support aspiration of increasing egg processing from <5% currently to 10-15% by FY32
- Launch awareness campaigns to educate progressive farmers on the best practices to achieve 20-30% premium on processed products like liquid and powdered eggs
- Incentivise farmers/ processors producing value-added products through equipment subsidies and tax credits

3. Aspire to export 15-20% of the egg produce by FY32

- Spearhead the development of a national standard grading system for eggs, in partnership with the National Egg Coordination Committee (NECC) to ensure quality, compliance and global acceptance of produce
- Increase egg weight by 10-15%, by promoting the use of crumbled feed and adopting best-in-class genetic strains and breeding techniques.
- Create a 'Brand Andhra' eggs campaign, positioning the state as a premier source of high-quality eggs in global markets

The Netherlands adoption of a comprehensive, end-to-end value chain approach has made the country a global leader in egg production and export (Figure 36).

Figure 36: Netherlands' end-to-end value chain approach for eggs

11 billion eggs/annum		**High-tech, efficient production systems**	• AI-powered egg sorting, robotic feeders, climate-controlled sheds and scientifically developed feed leading to higher productivity (300+ eggs per hen)
65% of produce exported	GFSI Global Food Safety Initiative	**Strong focus on quality & certification**	• 10-15% larger egg size due to better breeding techniques and feed quality • Strict quality standards (size, weight, shell strength) complying with food safety norms
40% high-value processing		**Processing & value-added egg products**	• State-of-the-art processing plants with strict biosecurity measures • 40% of all eggs processed into liquid eggs, powdered eggs, and boiled eggs
25% higher productivity vs. global average (280-300)		**Premium cage-free eggs**	• 70% of farms use cage-free and organic systems, attracting >50% price premium • Solar-powered poultry farms with eco-friendly waste management systems

2. Leading aquaculture and capture fisheries producer

The fisheries sector comprises 2 main segments: 1) aquaculture, referring to the controlled farming of aquatic organisms in freshwater (inland) or marine environments (marine culture) and 2) capture fisheries involving harvesting wild species from the nature.

Valued at $452 billion, global aquatic production reached 185 million tonnes in 2022. This year represented a significant milestone as aquaculture production (94 million tonnes) surpassed capture fisheries for the first time (91 million tonnes). Driven by rising disposable incomes, and increasing demand for nutrient-rich aquatic protein, the market is projected to reach 200-205 million tonnes by FY30, at a CAGR of 1-1.5%.[75]

With an output of 15-16 million tonnes[76] in 2022, India retained its position as the 2nd largest fisheries producer. This included 8.5 million tonnes from aquaculture and 5.5 million tonnes from capture fisheries, placing India 2nd in aquaculture (8% share) and 3rd in capture fisheries (6% share).

Accounting for 30% of the national output, AP is the largest seafood producing state in India (5-5.5 million tonnes p.a.)[77] and has consistently ranked first in aquaculture and fourth in capture fisheries. The state's dominance has been driven by aquaculture, which recorded a CAGR of 29.6% between 2014 and 2019. This growth was driven by enabling policy reforms, rapid technology adoption, and significant investments in infrastructure development including 100 cold storages (0.24 million tonnes annual capacity), 40 feed mills (10,000 tonnes/day capacity) and 100 seafood (primarily shrimp) processing plants (6,000 tonnes/day capacity). However, in recent years (2019-2024), growth has moderated

to 8% CAGR due to a confluence of systemic challenges including rising production costs, increasing disease outbreaks, pressure on existing infrastructure, price fluctuations, and intensifying competition from other countries such as Ecuador.[78]

Contributing 5-7% to national fisheries production, VER is a strategically important region for the sector. In FY22, VER produced around 1 million tonnes of seafood, accounting for nearly 20% of AP's output. This included 0.4 million tonnes from capture fisheries, where VER contributes a substantial 50-55% share of the state's output, reflecting the effective use of its 520 km coastline. However, its aquaculture output of 0.6 million tonnes represents only 13-15% of the state's production, highlighting a key bottleneck to the sector's sustainable growth (Figure 37). Interestingly, while the broader state and VER continue to be important centres for aquatic production, the state has had negligible production of aquatic plants like seaweed, a rapidly growing segment globally.

Figure 37: AP and VER's aquaculture and capture output, FY22

Category	Sub-category	AP (Mn MT)	VER (Mn MT)	VER's share of AP (%)
Aquaculture	Fish	3.9	0.5	10-15%
	Crustaceans (shrimp/ prawn)	0.7	0.1	14-18%
Capture	Fish	0.6	0.3	50-55%
	Crustaceans (shrimp/ prawn)	0.2	0.1	50-55%
Total		**5-5.5**	**1**	**18-20%**

Aspiration for VER

In line with 'Swarna Andhra @2047' vision, VER should aspire to increase seafood production by 1.5-2 million tonnes, leading to an incremental GVA of $2-2.5 billion and creation of 40,000-50,000 new jobs by FY32. Figure 38 highlights the significant shifts in KPIs required to achieve VER's vision.

Figure 38: KPIs for fish production

	From (FY24)	To (FY32)
Area under fisheries (in '000 acres)	100+	170-180
Total production (in MMTPA)	0.8-1	2.5-3
Automatic feeder penetration (%)	<5%	30%
Processing (%)	10%	30%
Exports (%)	30%	50%+
High value species (%)	1-2%	5%
GVA (in $ billion)	1.5	3.5-4

Achieving the vision will require a three-pronged approach across aquaculture, capture and seaweed cultivation as detailed ahead.

Figure 39: Three-pronged approach to achieve seafood aspirations

Triple VER's aquaculture output from 0.6 to 1.5-2 million tonnes by FY32	Increase VER's share in state's capture fisheries from 50-55% in FY22 to 75% by FY32	Emerge as India's top 3 seaweed producing regions by FY32

2.1. Aquaculture

VER's aquaculture production was 0.6 million tonnes (14% of AP) in FY22. Though the region holds a small share of AP, it continues to hold national significance with a 5-7% share of India. In FY24, VER produced 180,000 tonnes of the Indian Major Carp, making it the dominant species cultured. Together, the top five species including IMC, crustaceans, common carp, catfish, and mullets, account for over 80% of the total aquaculture output.

Key challenges

Key challenges that could hinder VER's aspiration of tripling aquaculture produce include:

Figure 40: Challenges faced by the aquaculture sector in VER

Fish	Low yield vs. global benchmarks	AP had average productivity of 37 kg/hectare/year for reservoir-based inland aquaculture. This is much lower than international best-in-class examples like China's with an average yield of 500 kg/hectare/ year[79]
	Seed and broodstock supply	Scarcity of quality seed and poor management of broodstock, especially for high-demand fish species like pangasius and tilapia
	Limited diversification	IMC dominate production with a 40-45% share. They offer low opportunities for processing and export. There is low diversification to high-value species such as pangasius, tilapia, roopchand and grass carp
Crustaceans (Shrimp/ Prawn)	Low yield vs. global benchmarks	Shrimp and prawn yields in VER are significantly lower, reaching only 8.9 tonnes/hectare/year vs. global average of 10-15 tonnes/ hectare/year
	Low survival rates	Survival rates are low, with only 50% of shrimp surviving. A primary factor driving this is poor seed quality, which leads to frequent disease outbreaks like White spot syndrome
	Low technology penetration	Low adoption of technology-driven farming practices such as genetic modifications to enhance disease resistance and automation of feeding systems
	Infrastructural bottlenecks	Lack of adequate infrastructure at a state and national level including 1) India's reliance on a single quarantine facility in Chennai and 2) low penetration of BMCs in AP (capable of meeting only 10% of the state's demand)
	Lack of certifications	Lack of ASC certification (10% for VER vs. 60% in Ecuador), combined with sanitary and phytosanitary (SPS) violations, leads to high rejection rates in the US and EU markets
	Untapped re-export opportunity	Global shrimp re-export market is valued at approximately $20 billion.[80] Though well-poised, AP has not been able to capitalise on this opportunity due to structural challenges like additional cess, slow port logistics and higher clearances as detailed in Figure 41

Figure 41: Andhra's untapped shrimp re-export opportunity

The global shrimp re-export market is valued at approximately $20 billion, with China currently leading as the top re-exporting country. To ensure supply chain resilience, China has diversified its shrimp import sources; primarily sourcing from Ecuador, India, and Vietnam. Notably, Ecuador's share of China's shrimp imports increased from 50% in 2019 to 71% in 2022, reaching an export volume of 0.7 million MT.[81] In parallel, China has significantly expanded its processing capabilities, particularly in coastal hubs like Zhanjiang and Qingdao, through the adoption of automated processing lines and Individual Quick Freezing (IQF) technology to enable value addition.

Andhra Pradesh has the potential to capture $1 billion (5%) of the global re-export market by FY32, with VER contributing to 30% of this share by unlocking systemic challenges that hinder the state's competitiveness in the re-export space including:

- **Additional state cess:** AP is currently the only state in India levying a 0.25% cess on seafood container exports, making it less cost competitive
- **Slow port logistics:** Container clearance times average 18-20 days in AP, compared to 2-3 days in Vietnam
- **High clearance costs:** Around $1,000 per container, versus $350 in competing markets

Proposed interventions to achieve VER's aspiration

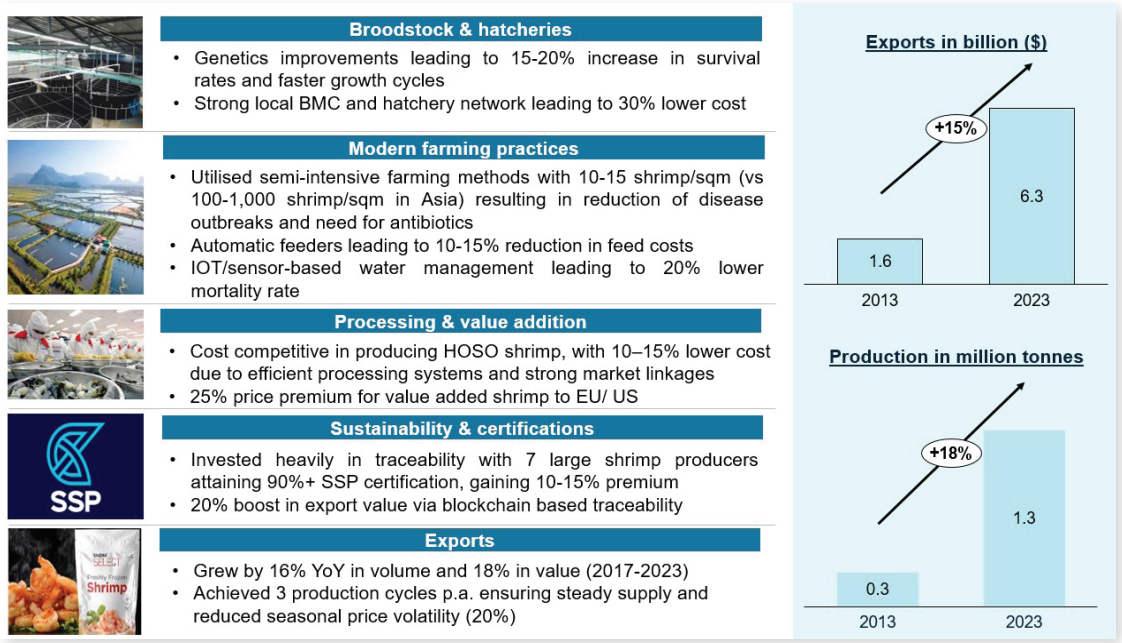
To triple VER's aquaculture output from 0.6 million tonnes in FY22 to 1.5-2 million tonnes by FY32, 5 interventions have been prioritised as detailed below:

1. **Increase area:** Target increasing area under cultivation of fish and shrimp from 100,000 to 245,000 acres by FY32
2. **Strengthening infrastructure for overall growth**
   - **Integrated aquapark:** Establish an integrated aquapark in Kakinada (200 acres), encompassing 1 Nucleus Breeding Centre (NBC), 1 BMC and 15-20 processing units
   - **Cold storage:** Increase region's cold storage capacity by over 500,000 tonnes
   - **Quarantine facility:** Develop a quarantine centre in Anakapalli or Visakhapatnam to reduce reliance on the Chennai facility, and facilitate direct, low-cost broodstock imports to VER
3. **Diversification of species:** To unlock new market opportunities, the industry must pivot from its heavy reliance on IMC and other low value species by:
   - Expanding farming and processing capacity for species with established export demand, such as pangasius, grass carp, and silver carp
   - Launching pilot farms, dedicated research programs, and investing in broodstock and hatchery capacity for species with emerging global demand like tilapia, mud crab, seabass, and pomfret

4. **Yield improvement:** VER should aspire to double shrimp yield (from 8-9 to 16-18 tonnes/hectare) and quadruple fish yield (reservoir from 37 to 150 kg/hectares) in line with global benchmarks through the following set of interventions:
   - Provide subsidies to increase automated feeder penetration from <5% currently to over 30% by FY32
   - Optimise pond and water management through precise pH adjustments, consistent fertilisation and sensor-based monitoring
   - Cluster-based training programs to disseminate best practices among farmers (e.g. stocking density of 8,000-10,000 fingerlings/hectare)
   - Adopt genetically improved, disease-resistant seed varieties to enhance stock resilience and reduce mortality, thereby improving fish survival rates by 10–15%.
   - Switch from low-quality mash feed to high-protein pelleted feed to boost growth rates
5. **Select interventions to tap into VER's re-export potential**
   - Rationalise port clearance fees from $1,000/container to $350/container
   - Reduce clearance time from 18-20 days currently to 2-3 days in line with global benchmarks
   - Explore potential to remove the 0.25% state cess on seafood container exports
   - Ensure 100% farm and related facility registration with regulatory bodies like CAA, MPEDA, or the state fisheries department to improve traceability, meet export compliance standards and demand premium on produce

VER can take inspiration from global best practices like Ecuador's recent success in shrimp production, as detailed in Figure 42.

Figure 42: Ecuador's shrimp revolution over the past decade



2.2. Capture fisheries

Capture fisheries added an estimated 0.4 million tonnes to VER's output, accounting for over 50% of Andhra Pradesh's total marine production in FY22. 5 species account for more than 50% of the catch and include shrimp, tuna, mackerels, ribbon fish, and sardine.

Key challenges

Key challenges that could hinder the growth of capture fisheries in VER include:

Figure 43: Challenges faced by capture fisheries in VER

Traditional methods	Heavy reliance on tradition fishing methods restricts access to offshore resources. Currently only 44% of fishing boats are mechanised
Infrastructure deficiencies	Many harbours lack essential facilities such as ice plants, cold storage, fuel stations and auction platforms. This weak ecosystem leads to severe post-harvest losses, as high as 20%
Coastal sedimentation	Sea mouths are vulnerable to annual sedimentation. Lack of regular dredging restricts access for larger vessels
Untapped deep-sea ecosystem	Lack of modern vessels with on-dock chilling and processing provision leads to high spoilage rates of capture. Further, lack of trained personnel adds to the missed deep-sea opportunity

Proposed interventions to achieve VER's capture aspiration

To increase VER's share in the state's marine capture from 50-55% in 2022 to 75% by FY32, the following interventions have been prioritised:

1. Ensuring 100% motorisation and upgradation of existing fleet to include tracking systems and on-vessel chilling units
2. Enabling the procurement of the first 100 deep sea fishing vessels (DSFVs) and 5-7 mother vessels equipped with advanced technology like Vessel Communication and Tracking Systems (VCTS) by providing subsidies/incentives for upgrades
3. Constructing 5 new fishing harbours in VER, including expedited completion of 3 proposed harbours at Pudimadaka, Uppada, and Budagatlapalem
4. Expanding mandate of APSADA or identify alternate agency to oversee creation, regulation and governance of fishing harbours

2.3. Seaweed

The global seaweed industry was valued at $9.9 billion in 2021 and is projected to reach $12-13 billion by FY32 at a CAGR of 2.3%.[82] Total production stands at 37.8 million tons (wet weight).[83] China and Indonesia dominate the market, accounting for 85% of global

output. This dominance is driven by focused seaweed cultivation (vs. reliance on wild capture) which contributes 97% of their total production.

The seaweed industry in India was valued at $80 million in FY24. India harvested 72,000 tonnes (0.2% of global produce) of seaweed in FY23, mostly through wild collection in Tamil Nadu and Gujarat (80% share).[84] The country's domestic demand exceeds production, resulting in import reliance on countries like South Korea and China.

With a 5-10% national share, AP has the base ecosystem to scale seaweed culture and emerge as a credible producer and exporter of seaweed-based products.

VER's aspiration

While VER's current seaweed production is a modest 200 tonnes (FY24), primarily through wild capture, the region has the potential to contribute 10% to India's FY30 seaweed production target of 1 million tonnes. By increasing area under cultivation by 13,000 hectares, VER can generate $200-250 million in incremental GVA.

Key challenges

Despite suitable conditions and availability of the Kappaphycus and Gracilaria species, Andhra Pradesh lags in seaweed production. This is due to a myriad of factors including low technology integration, limited seed access, high capital costs for tube-net systems, lack of targeted subsidy frameworks and low farmer awareness.

Proposed interventions to achieve VER's aspiration

1. **Area expansion:** Expand the area under seaweed cultivation to 13,000 hectares. Interestingly, 10% of this area (1,300-1,500 hectares)[85] has already been identified and earmarked for seaweed cultivation across Visakhapatnam, Dr. B.R. Ambedkar Konaseema, and Vizianagaram districts
2. **Productivity enhancement:** Achieve a productivity of 70,000 tonnes/ hectare in line with Indonesia's production benchmarks by adopting several strategies:
    - Promoting tube-net farming method which is particularly well-suited for high tidal zones of VER, through enhanced subsidies
    - Promoting adoption of Integrated Multi-Trophic Aquaculture (IMTA) by leveraging waste from other farmed species as a natural fertiliser. Studies by CMFRI have demonstrated 50% yield improvement
    - Creating farmer training programs to improve awareness of best cultivation techniques and practices
3. **Infrastructural upgrades:** VER should aspire to standardise seaweed moisture levels to 40% by creating robust drying infrastructure. Incentives should be provided for establishment of drying cooperatives and solar dryers

4. **Policy unlocks:** Creating long-term leasing framework for accessing saline lands and converting identified saline CRZ wastelands (formerly used for illegal aquaculture) into zones for pond-based seaweed cultivation

3. Cluster-based development of 5 horticulture value chains

Andhra Pradesh has emerged as a powerhouse in the horticulture, with the sector consistently contributing 25-30% to the state's agriculture GVA. With the horticulture GVA growing at a nominal CAGR of 17.6% over the past decade, it is one of the faster growing agriculture sub-segments in AP. The state is a leading producer of various horticulture crops such as chillies, oil palm and sweet orange.

VER's horticulture GVA for FY23 was around $3 billion. While VER accounts for only 11% of Andhra Pradesh's horticulture output, it is a leading producer of five important value chains: Araku coffee, oil palm, banana, cashew, and coconut. Together, these five crops contribute nearly 50% of the region's horticulture GVA.[86] Each of these value chains is well-aligned with VER's unique agro-climatic strengths and holds significant potential to enhance the livelihoods of tribal communities.

Aspiration for horticulture in VER

As part of this Economic Master Plan, VER can aspire to double its GVA from the production of these 5 crops to $3 billion by FY32. The plan identifies focused interventions at a crop level for these prioritised value chains, as detailed below:

3.1. Araku Coffee

The global coffee industry was valued at $260 billion[87] in 2024 and is projected to grow to $400 billion by 2032,[88] at a CAGR of 5.5%. Brazil and Vietnam dominate the market, accounting for more than half of the global production (56% share).[89]

Of this, the specialty coffee market, currently a $100 billion industry is projected to reach $224 billion by 2032, growing at nearly twice the pace of the overall industry (10.6% CAGR). This accelerated pace highlights the evolving demand for superior quality, flavours, and aroma.

With an output of 360,000 MT in FY24, India ranked 7th in global coffee production (3.5% share). The total export market was valued at $1.2 billion in FY24.[90] About 80% of these exports were dominated by robusta coffee (70% of India's production), with a small share of premium specialty coffee varieties like arabica.

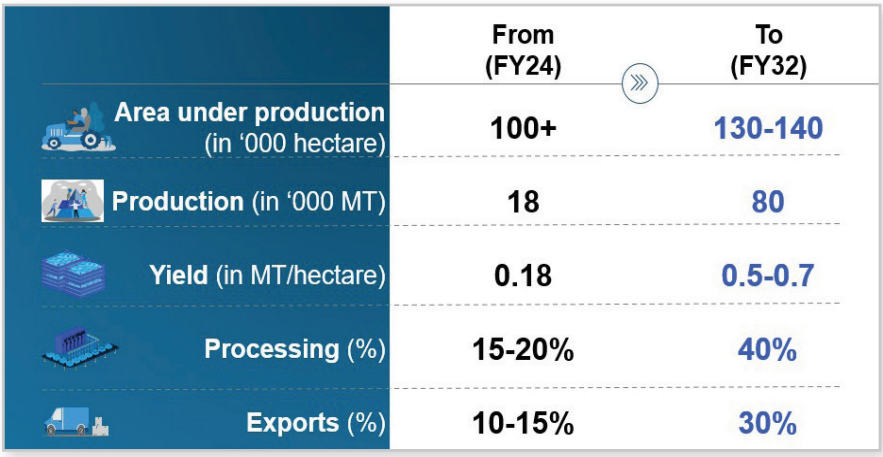
Andhra Pradesh produced 18,000 MT of coffee in FY24, making it the 4th largest coffee producing state in India. It is interesting to note that 100% of the state's production is the specialty variant arabica, produced in the Araku valley belt of VER. The region is well placed to benefit from the increasing recall of Araku coffee as a GI tagged brand,

rapidly growing domestic coffee consumption (3-4% p.a.) and expanding global demand for certified and traceable specialty coffee from regions like Europe, Korea and Japan.

Aspiration for VER

This Economic Master Plan envisions making AP the 3rd largest coffee producer in India by increasing coffee production from 18,000 MT currently to 80,000 MT by FY32. To realise this target, the plan necessitates bringing an additional 30,000-40,000 hectares under cultivation, as suggested in the 'Swarna Andhra@2047' vision. Figure 44 highlights the significant shifts in KPIs required to achieve VER's aspiration.

Figure 44: KPIs for Araku coffee



To effectively chart a strategic roadmap for the coffee sector, a combined view of challenges and interventions has been shown in Figure 45.

Figure 45: Key challenges and interventions across coffee value chain

Challenges	Pain points	Interventions
Low yield (180 kg/ha vs. 600 kg/ha national average)	Low usage of high-yielding seeds	• Promote certified high-yield variety seeds like Chandragiri (6, 6A, 8A, 8B, 13)
	Senile plantations	• Undertake annual rejuvenation of 4,000 hectares in line with the Swarna Andhra@2047 vision as 50% of the plants are over 15 years
	Untapped income potential	• Encourage intercropping with shade trees like jackfruit, pepper, and jamun to boost biodiversity and farmer income

Poor harvesting and post harvesting practices	40% strip picking	• Sensitise and educate farmers to adopt selective picking practices (vs. strip picking) to improve harvest quality
	Inadequate drying infrastructure	• Currently, 80% of the produce is floor dried. GoAP should explore subsidies for community-based tarpaulin, raised beds, and solar dryers
	Inadequate processing infrastructure	• Develop 200-acre organic food processing park at Anakapalli and attract 2-3 anchor investors, to prioritise coffee as a key crop • Decentralised processing scale-up including tripling baby pulpers from 5,000 to 15,000 units (capacity of 100 kg/day/unit) and doubling eco-pulping units from 30 to 60 units (capacity of 500-2,000 kg/hour/unit) • Quadruple micro-washing stations to 100
	Lack of quality labs	• Establish 1 quality lab for cupping, grading, and moisture testing in Araku or Anakapalli
Lack of quality certification and market access	Low share of organic production	• Aspire to expand area under organic certification from 2,600 (<3%) to 10,000-11,000 hectares • Increase farmers undertaking organic certification from 2,300 to 10,000 • The entire ASR and Parvathipuram Manyam districts should be classified as organic zones
	Poor market linkages	• Launch a coffee auction platform similar to Ethiopia, to enable direct access to specialty markets and improve farmgate prices by 30%

3.2. Oil Palm

With a production of over 76 million tonnes in 2024, the global palm oil industry was valued at $72.8 billion and is projected to reach $100 billion by 2032, growing at a CAGR of 5.3%.[91] Its versatile use across food, cosmetics, and biofuel sectors, makes it the most consumed vegetable oil worldwide. Indonesia and Malaysia dominate the market, together accounting for over 80% of global production.

Domestically, India produces 4-5 million tonnes of oil palm fruit commonly known as the Fresh Fruit Bunch (FFB), which is further processed to produce 0.4 million tonnes[92] of Crude Palm Oil (CPO). The domestic production satisfies only 3-5% of the country's demand of CPO, leading to imports of 6-8 million tonnes of oil annually, making India one of the largest importers of CPO.[93] To reduce this heavy reliance on imports, India launched the 'National Mission on Edible Oils-Oil Palm' in 2019, targeting to increase domestic

production of CPO to 2.8 million tonnes by 2030.[94]

Currently, Andhra Pradesh is the leading FFB and CPO producing state in India, producing 3.9 million tonnes of FFB and 0.3 million tonnes of CPO. With around 0.1 million tonnes, VER accounts for 40% of the state's CPO production. East Godavari (15%) and Kakinada (9%) districts are key contributors.

In addition to the national drive, the crop offers strong farmer economics, with potential incomes reaching ₹100,000 per hectare during the growth phase (years 4-8) and ₹200,000-300,000 per hectare at maturity (years 8-15), making it a highly attractive cash crop for cultivation.

Key challenges

Despite being a leading domestic producer, VER's oil palm sector faces several critical challenges that could hinder its growth as mentioned in Figure 46.

Figure 46: Key challenges across the oil palm value chain

Price competition	• FFB cost in India (₹17,000-18,000/tonne) is higher than other countries like Indonesia (₹14,000/tonne)[95] • This is further aggravated by low import duties for key exporters like Indonesia and Malaysia
Potential to further improve yields	• Although the region's productivity is high, yields are 5% lower than global best of 20-25 tonnes/hectare • Factors leading to relatively lower productivity include 1) Shortage of high-yielding planting material 2) Limited use of drip irrigation and 3) Inadequate use of fertilisers
Strong entry barrier	• The crop's long gestation period (3-4 years), without any harvest related revenue creates significant financial burden, limiting cultivation by small and marginal farmers with capital constraints
Inefficient oil extraction	• Lower oil extraction ratio (18%) vs. global benchmark (22%) owing to varietal difference and the use of sub-optimal processing technologies

Aspiration for VER

This Economic Master Plan envisions to retain and further solidify VER's national leadership in crude palm oil production by increasing the region's oil palm production from the current 0.1 million tonnes to 0.4 million tonnes, contributing 7% to the national production target of 5-5.4 million tonnes by FY32.

Figure 47 highlights the significant shifts in KPIs required to achieve VER's vision.

Figure 47: KPIs for oil palm production in VER

	From (FY24)	To (FY32)
Area under production (in '000 hectare)	75	155
Palm oil production (in '000 MT)	100-125	350-400
Oil Palm production (in '000 MT)	1,500	3,600
Yield (in MT/hectare)	20	24
Oil extraction ratio (%)	18%	22%

Proposed interventions to achieve VER's aspiration

As part of this Economic Master Plan, VER should aspire to double FFB production and increase CPO output fourfold by FY32. To achieve this aspiration, a series of interventions across the entire value chain have been prioritised, as detailed below:

1. **Yield enhancement:** To achieve the ambitious yield target of 24 tonnes/ hectare, the following interventions are required:
   - Promoting the use of high-yielding planting material and expanding nursery capacity to produce 2-2.5 million seedlings per year.
   - Promoting advanced agronomic practices, including drip irrigation and fertigation systems.
   - Facilitating comprehensive farmer training programs in partnership with the Indian Institute of Oil Palm Research.
2. **Farming and production**
   - Double the cultivated areas from 75,000 to 155,000 hectares in VER, leveraging the land identification already conducted by ICAR.[96]
   - Enable more farmers to participate in the mission by ensuring the availability of affordable loans with longer moratorium (3-4 years).
   - Encourage educated farmers to practise intercropping with high-value crops like cocoa and banana to provide steady income during non-yielding period.
3. **Improving processing efficiency**
   - Incentivise use of sulphur-based fertilisers to improve fruit quality.
   - Establish 40-60 farm-machinery banks and custom hiring centres for oil palm operations. This will help reduce manual labour and operational costs and enable improving OER from 18% to 22%.

3.3. Banana

Global production of bananas surpassed 139 million tonnes in 2023.[97] The market is highly concentrated, with six nations: India, China, Indonesia, Nigeria, Ecuador, and Brazil, together accounting for nearly 50-60% of the world's total output.

India holds a commanding position as the world's largest banana producer, with a 26% share (36.6 million tonnes) in FY23. However, this volume leadership is undermined by a critical productivity gap: India's average yield of 38 tonnes/hectare is much lower than Turkey, which achieves 70 tonnes/hectare despite being ranked 25th overall. The lower yield, highlights a critical opportunity for India to enhance practices to boost output.

Till 2023, Andhra Pradesh was India's top banana producer, with 17% share and over 6.8 million tonnes of output.[98] However, Maharashtra has surpassed AP in 2024 to emerge as the largest producer in 2024.[99]

VER produced 2-2.5 million tonnes of bananas in FY25, accounting for approximately 34% of the state's total output. This production is primarily driven by three key districts: East Godavari (10%), Dr. B.R. Ambedkar Konaseema (8%), and Parvathipuram Manyam (7%). Furthermore, with a high productivity rate of 64-68 tonnes/hectare, VER is recognised as one of the most productive banana-producing regions across the country.

Key challenges

Despite being one of the largest and most productive bananas producing region, the banana sector in VER faces significant challenges, as detailed in Figure 48.

Figure 48: Key challenges across the banana value chain

Low cultivation of export varieties	• While the Rayalaseema region of AP exports 70-80% of the produce to other states, VER exports only 40%.[100] • This is primarily due to the cultivation of low demand varieties like Chakkarakeli and Karpura in VER vs. high demand varieties like G9
Inadequacy of tissue culture labs	• Currently there is only one tissue culture lab in East Godavari, constrained by a modest capacity of 300,000 saplings/year. In contrast, Anantpur has 2 labs with a combined capacity of 5 million saplings/year
Lack of infrastructure	• High post-harvest losses (14%) due to insufficient temperature control infrastructure (such as cold storage and ripening chambers)

Aspiration for VER

The vision is to increase VER's banana production by 50% from 2-2.5 million tonnes in FY24 to over 3.5 million tonnes by FY32. Figure 49 highlights the significant shifts in KPIs required to achieve VER's vision.

Figure 49: KPIs for banana

	From (FY24)	To (FY32)
Area under production (in' 000 hectare)	30-35	50
Production (in '000 MT)	2,000-2,500	3,500
Yield (in MT/hectare)	64-68	70
Processing (%)	1%	15-20%
Exports (%)	1%	15-20%
Post harvest loss (%)	14%	7%

Proposed interventions to achieve VER's aspiration

As part of this Economic Master Plan, VER should aspire to increase banana production to 3.5 million tonnes by FY32. To achieve this aspiration, a series of interventions across the entire value chain have been prioritised, as detailed below:

1. **Improving share of exports:** Promoting the use of G9 variety can help unlock both domestic and international export markets and raise the export share to 15-20%. To ensure access to these high-quality seeds, technical support from the Horticulture Research Station in Kovvur, East Godavari will be required
2. **Expanding area under cultivation:** Add 15,000-20,000 hectares of additional area under banana cultivation by 50% and create additional tissue culture plants to support an annual requirement of 6.4 million plants by FY32
3. **Increasing focus on processing:** Target increasing share of processed production to 15-20% by FY32 by:
   - **Developing a food processing park:** Developing the proposed 200-acre multi-crop food processing park in Vizianagaram, enabling value addition through chips, juice, and fibre products

- **Attracting anchor investors:** Attracting 2-3 anchor investors to kickstart a targeted 0.6 million tonnes of total processing capacity to achieve 15-20% processing targets

4. **Reducing post-harvest losses:** Targeting reduction of post-harvest loss from 14% currently to less than 7% by FY32 by increasing technology adoption across fruit care activities like:
   - Installing 7 ripening chambers of 500 tonnes each across the East Godavari, Dr. B.R. Ambedkar Konaseema and Parvathipuram Manyam districts
   - Creating one integrated pack house in the region
   - Promoting development of multiple waste-to-value facilities

3.4. Cashew

Context

The global cashew market was valued at $7.7 billion in 2024 and is projected to reach $10.2 billion by 2032, growing at a CAGR of 4%.[101] The market is highly concentrated, with over 50% of the world's production coming from Côte d'Ivoire, India, and Vietnam. In 2023, processed kernel exports were valued at $6.4 billion, with Vietnam leading the export market with a 45% ($2.9 billion) share.[102]

India is the world's second-largest cashew producer, with an annual output of over 750,000 tonnes in 2024. India's average yield is 0.7 tonnes/ hectare, well above the global average but much lower than best-in-class benchmarks like Vietnam (1.2 tonnes/hectare). While India is a major producer, it has a limited presence in the processed kernel export market, with only $350 million in exports.

Next only to Maharashtra, Andhra Pradesh is the second-largest cashew-producing state, with an output of 135,000 tonnes in 2023. VER is the heartland of AP's cashew sector, contributing 93% to the state's output with an average yield of 1-1.2 tonnes/hectare.[103] Srikakulam, ASR, Anakapalli, and Parvathipuram Manyam together accounting for 60% of VER's cashew production. The Palasa cluster in Srikakulam, renowned as the 'White Gold City', is one of the largest cashew processing hubs in India, hosting nearly 300 units.

Key challenges

Despite its strong position in production and processing, the sector faces several challenges that limit its full potential as detailed in Figure 50.

Figure 50: Key challenges across the cashew value chain

Senile plantations	• Significant presence of trees aged over 30 years is expected to impact future productivity
Inefficient agronomic practices	• Use of uncertified grafts and low adoption of pest-resistant, export-grade seed varieties lead to inconsistent nut size and inferior quality • Limited adoption of scientific practices such as Integrated Nutrient Management (INM), Integrated Pest Management (IPM), and modern canopy management • Scarcity of decentralised nurseries hinders widespread adoption of grafted saplings
Traditional processing techniques	• Reliance on imported raw cashew from Africa (due to their bigger size and better colour) increases overall domestic processing costs • Reliance on traditional techniques such as manual labour for shelling/peeling and improper drying reduces the visual appeal and marketability of kernels in high-value markets

Aspiration for VER

This Economic Master Plan envisions to make AP the number one cashew-producing state while increasing VER's production to 200,000-250,000 tonnes by FY32. Figure 51 highlights the significant shifts in KPIs required to achieve this vision.

Figure 51: KPIs for cashew

	From (FY24)	To (FY32)
Area under production (in '000 hectare)	125	160
Production (in '000 MT)	155	200-250
Yield (in MT/hectare)	1-1.2	1.3-1.4
Processing (%)	20%	50%
Exports (%)	3-5%	15-20%

Proposed interventions to achieve VER's aspiration

To achieve the aspiration of becoming the national leader in cashew production, the following targeted interventions are required across the value chain.

1. **Improving productivity of plantations**
   - **Adopt high-yielding varieties:** Adopting varieties such as BPT3, BPT9, and Vengurla1 can help improve domestic productivity and quality, reducing import reliance on Africa. Quality seedlings should be sourced from the centralised Cashew Research Station, Bapatla to ensure superior plant material
   - **Establish a decentralised nursery network:** To ensure timely and widespread availability of high-quality seeds, decentralised nursery network should be established eliminating the need for farmers to travel long distances for planting material
   - **Systematic plantation renewal:** Prioritise the replacement of old, unproductive trees with elite, high-yielding grafted varieties, targeting annual rejuvenation of 2,000 hectares. Further, all new plantations should adopt high-density planting techniques to increase count to 400-500 trees/hectare from the current average of 200 trees/ hectare
   - **Intercropping for farmer income:** Encourage intercropping with crops like pineapple, cocoa, and turmeric, following Vietnam's model to increase overall farm earnings by up to 50%
2. **Increased focus on value-added processing and exports:** Target increasing share of processed production to 50% and exports to 15-20% by FY32 by:
   - **Providing subsidies for automated machinery:** To improve quality, the government should provide subsidies for automated shelling and colour sorting machinery
   - **Attracting anchor investors:** Replicate the success of the existing Palasa cluster to create a "Palasa 2.0" cluster by attracting 2-3 anchor investors across the proposed multi-product food processing parks in Vizianagaram and Anakapalli
   - **Brand building:** Pursue GI tagging to establish a unique and premium brand identity for VER cashews in the global market. Additionally, promote investments to improve traceability, to enhance global recall

Figure 52: Vietnam's success story in re-export

The global cashew value chain is significantly shaped by the cashew re-export market, where countries import raw nuts, process them, and then export the finished product. Vietnam and India are the dominant importers of raw cashew, together importing over 3.5 million tonnes annually (over 80% of global imports).

Despite its status as the world's second-largest producer, India imports 1.2 million tonnes of raw cashews each year, predominantly to meet domestic demand. In contrast, Vietnam has strategically positioned itself as the global leader in processed cashew exports and re-exports despite having a smaller domestic output. Its success, which began in the 1990s with the designation of cashew as a national priority crop, can be attributed to several factors:

- **Favourable policies:** The Vietnamese government implemented policies like reduced import duties on raw cashews, and export duty waivers on processed kernels to support processors and exporters
- **Early adoption of mechanisation:** Due to early and widespread adoption of automation, 80-90% of cashew processing in Vietnam is now mechanised, leading to lower costs and consistent output quality. Vietnam boasts of a processing capacity of over 1.5 million tonnes per annum
- **Focus on export-oriented value chain:** Vietnam's investments in workforce skilling and establishing global market linkages has helped the country capture a larger share of exports, with the market reaching $2.9 billion in 2023[102]
- **Research and quality control:** Vietnam invested in R&D to improve processing techniques and maintain quality standards, which are crucial for competing in the global market. They have also established a strong reputation for traceability and food safety, which are key requirements for markets in Europe and North America

3.5. Coconut

With a global production of 66,000 million nuts of coconut,[104] the industry was valued at over $20 billion in 2022 and is projected to reach $45 billion by 2032, growing at a CAGR of 8-9%.[105] This growth is driven by increasing demand for health and wellness products like virgin coconut oil, coconut water, and coir-based biofibres. Philippines, Indonesia, and India collectively account for nearly 75% of the global production.[106]

Contributing 32% to global output, India was the third largest coconut producer (21,300 million nuts) in FY24.[106] However, India's average productivity is much lower, at 9,800 nuts/hectare as compared to countries like the Philippines at 15,000 nuts/hectare.[106]

Andhra Pradesh is the 4th largest coconut producing state in India. With an 8.7% share,

AP produced 1,700 million nuts in FY24. VER is the coconut heartland of AP, contributing 65% (1,300 million nuts) to the state's production, with Dr. B.R. Ambedkar Konaseema alone accounting for more than 40%. VER ranks among the best-performing coconut zones globally, enabled by fertile alluvial soils, dense plantations and adequate canal irrigation. It's high average productivity of almost 16,000 nuts/hectare (more than the national average) positions it favourably for future growth and value addition.

Aspiration for coconut production in VER

This Economic Master Plan aspired to increase VER's coconut production from 1,300 to 1,600 million nuts, while doubling the weight/nut. Figure 53 highlights the significant shifts in KPIs required to achieve VER's vision.

Figure 53: KPIs for coconut

	From (FY24)	To (FY32)
Area under production (in '000 hectare)	80-82	86-87
Production (in million nuts)	1,300	1,600
Weight (in grams)	500	800-1,000
Processing (%)	5-10%	30%

Key challenges

Despite being a leader in coconut productivity, the sector faces several key challenges that must be addressed to unlock its full potential:

Figure 54: Challenges across coconut value chain

Lower weight of coconut limits market access	• VER coconuts are much smaller in size (500 grams) compared to those in Karnataka and Kerala (800 grams). The smaller size is due to low adoption of high-yielding seed varieties (such as godavari ganga, double century), and limited use of fertilisers • The smaller size limits market access and most coconuts are sold as whole nuts for religious purposes within India, bypassing higher-value export processing channels for copra and oil

Infrastructure gaps	• Limited processing infrastructure in VER (less than 10 coconuts processing units) with low private sector participation • Produce is transported as raw fruit for value addition to processing hubs in other states like Tamil Nadu • Absence of robust cooperative ecosystem in the region unlike other states like Tamil Nadu

Proposed interventions to achieve VER's aspiration

1. Improve productivity and weight of coconuts

To achieve the aspiration of retaining national leadership in coconut production, while increasing share of processing and export, the following targeted interventions are required:

- Promote nutrient management programme (50 kg organic manure and 500:300:1000 grams NPK/palm/year), drip irrigation, and targeted pest control (eriophyid mite) to improve nut size. Karnataka's noticed a 20-30% nut weight increase by adopting these practices
- Replace old, senile, and disease-affected palms with high-yielding, larger-nut varieties like CO52, double century, godavari ganga, and ramganga. Tamil Nadu successfully piloted an enhanced variety (CO52), achieving 28-30% yield increase
- Expand capacity at Coconut Research Station in the Dr. B.R. Ambedkar Konaseema district to meet the regional demand for hybrid seedling production
- Integrate intercropping with crops such as cocoa, black pepper, and nutmeg to improve farmer incomes

2. Increase share of processing

- Develop integrated processing infrastructure i.e., coir fibre clusters, cold-pressed oil units, and shell-based product lines in proposed agro-food parks in Vizianagaram and Anakapalli
- Attract 2-3 anchor investors for coconut processing in the proposed food processing park in Vizianagaram and Anakapalli
- Enhance awareness of subsidies offered by the Coconut Development Board such as 25% subsidy under the Technology Mission for development of new processing units and the diversification of value-added products

4. Nursery capital of India with global export capability

East Godavari has established itself as a leader in nursery cultivation, contributing an estimated $100 million in GVA and employing around 50,000 people across 5,000-5,500

acres of cultivated area. The region produces a diverse range of plants and has emerged as India's nursery capital, supporting domestic demand from different states. It also exports products such as ornamental and avenue trees. While exports currently account for less than 2% of VER's production, there is a strong potential to elevate it to 10-15%.

Key challenges

- Lack of large-scale, high-tech facilities such as tissue culture labs, robotic grading, and export-compliant packaging
- Absence of an organised export facilitation and quality traceability system
- Limited international marketing and brand positioning of premium varieties produced in the region

Aspiration for VER

- Position East Godavari belt as India's nursery capital and double sector's GVA to $200 million by FY32
- Expand nursery cultivation by 40% by bringing an additional 1,500-2,000 acres under cultivation
- Increase exports from <2% to 10-15%, generating $120 million in additional export revenue by FY32

Proposed interventions to achieve VER's nursery aspirations

1. Develop 3-5 large technology-enabled nursery zones (1,500-2,000 acres total) with polyhouses, tissue culture labs, robotic grading, and cold-chain infrastructure
2. Establish export facilitation centres to enhance traceability and quality control
3. Set up state level accreditation and certification standards to improve quality and traceability to increase exports
4. Partner with agricultural universities for R&D, skilling, and technology adoption
5. Promote the state's premium plant varieties at international trade shows

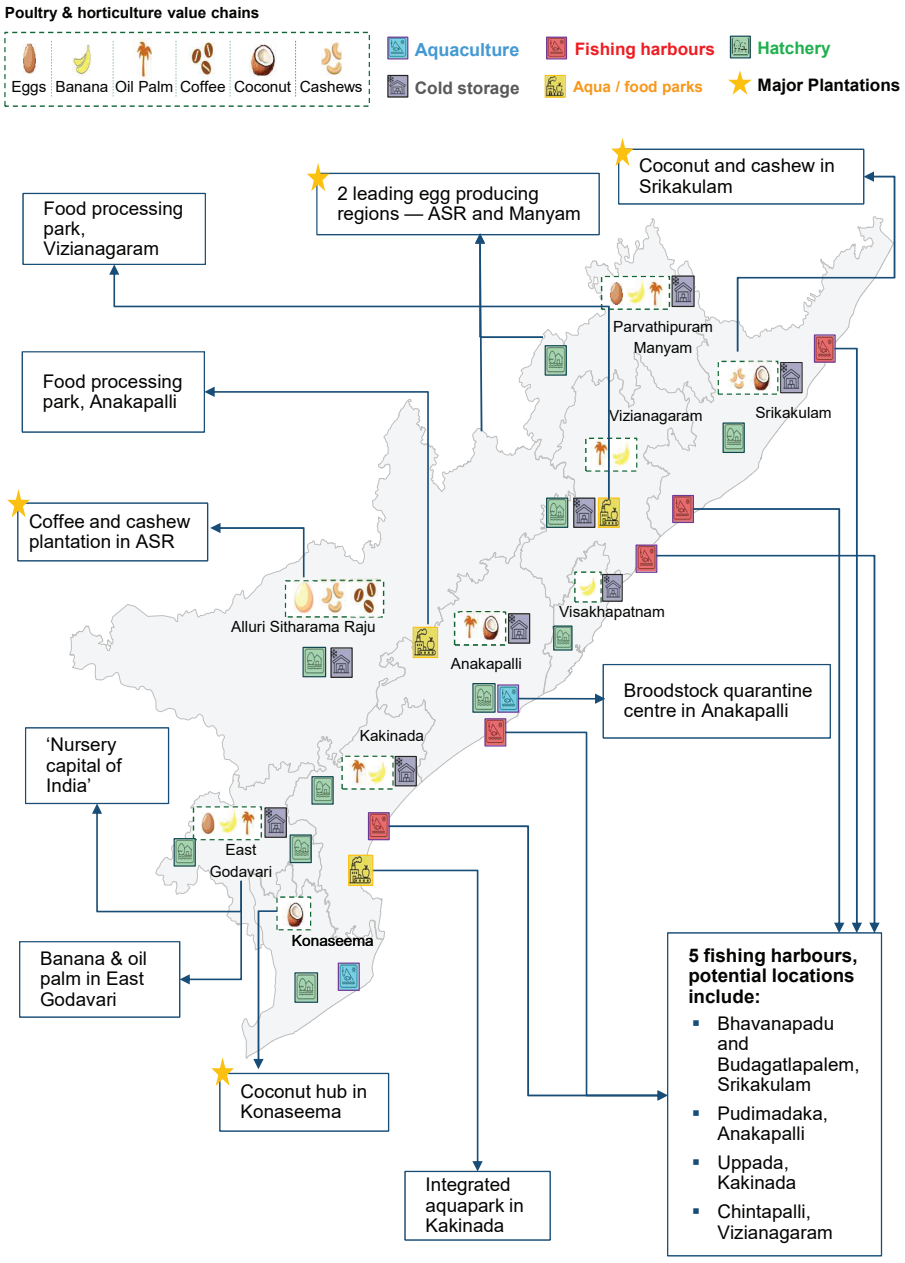
A total investment of over $100 million is envisioned for the nursery sector over the next 5-7 years to realise this ambition. This includes $40 million in central government subsidies to support the development of polyhouses, tissue culture labs, and cold chain infrastructure and $17 million from the state government for top-up subsidies, manpower training, and related initiatives. In parallel, $45 million investments will have to be attracted from private sector players for the development of large-scale nurseries enabled by climate-controlled technology and polyhouses.

Land, investments and policy architecture

1. Land and geographical landscape

The project will be geographically distributed across 19 major locations, including 7 large plantation areas, 1 world-class nursery region, 2 food parks, 1 integrated aquapark, 5 fishing harbours, and 2 key egg producing belts in ASR and Parvathipuram Manyam (Figure 55). Developing these locations will require 500-1,000 acres of land. Fortunately, 500-550 acres of land is readily available. The remaining land will require acquisition or private sector participation.

Figure 55: 19 major locations across agriculture and allied sectors



2. Investments

To realise VER's aspirations, the region will require an infusion of $1-2 billion in investments with over $1-1.5 billion sourced from the private sector. Additional contributions need to come from the state government ($100 million), the state government agencies ($140-150 million) and the central government ($100 million). The top three investment priorities, which account for a significant portion of the capital required are:

1. **Fishing harbours:** An investment of $200-250 million should be allocated for the development of five new fishing harbours. State agencies should contribute the majority of the funding ($100-150 million), with remaining capital sourced from central government subsidies under schemes like Pradhan Mantri Matsya Sampada Yojana (PMSSY). Notably, $100-150 million has already been committed to develop harbours at Uppada, Pudimadaka, and Budagatlapalem.
2. **Aquaculture expansion:** Nearly $200 million in capital expenditure will be directed toward increasing the area under aquaculture farms. This will be primarily funded by the private sector ($150-160 million), with the state government providing support through targeted subsidies.
3. **Processing infrastructure:** Approximately $300-350 million will be invested in establishing three large-scale processing facilities, including two food processing parks in Vizianagaram and Anakapalli (200 acres each) and one integrated aquapark in Kakinada. The private sector will be the primary investor, contributing 85% of the total capital ($85-100 million for each facility), with state agencies providing the remaining funds.
4. **Quarantine centre:** Approximately $10 million investment has been planned by the state government for establishing AP's first aquaculture quarantine centre in Anakapalli or Visakhapatnam.

3. Policy architecture

To support these growth aspirations, VER will require a strong state support framework across eggs, fisheries, horticulture and nursery. The policy unlocks and institutional shifts required are explained in detail in the chapter 'Projectisation, policies and institutional mandates.'

Growth Driver 4

Renowned tourism attraction

Context

Contributing $150-160 billion (5-5.2% overall, 2.6% direct) to India's GVA and employing nearly 3.3 million individuals in FY23,[107] tourism is a critical economic sector for India. Despite ranking 3rd in tourist footfall with 193 million visitors (12% of India's total) and employing 850,000 individuals, AP's tourism sector generated only $7-8 billion in GVA (5% of the national total) in FY23. This disparity highlights that AP is predominantly a high-volume, low-value tourism hub. Tourism in the state has historically been driven by religious travel, which accounts for 60-70% visitor footfall (e.g., Tirupati alone attracts 30 million tourists annually), leading to low average spend (₹1,700/day) and shorter stay durations (1-2 days).

As of FY24, VER had a tourism GVA of $1.3-1.5 billion in FY24 (20% of AP's total) and employed 200,000 individuals (40,000 direct jobs).[108] VER is home to a diverse array of attractions, including over 50 religious and spiritual sites, multiple national parks/reserves like Kambalakonda Wildlife Sanctuary, hill stations and ecotourism sites like Araku Valley and Lambasingi. It boasts of a rich 520 km coastline with over 30 beaches, an international cruise terminal, pristine backwaters like Dindi, and thriving mangrove forests like Coringa.

Bottlenecks hindering VER's tourism potential

Despite possessing a wealth of natural and cultural assets, VER is yet to emerge as a prominent tourist destination. Its tourism footfall is subdued, with an estimated annual footfall of 6 million domestic, 6,000 foreign arrivals, and 30,000-40,000 high-end visitors (FY23). Key challenges hindering VER's tourist potential include:

Figure 56: Key challenges in VER tourism

Under-developed products	• Heavy reliance on religious sites (60-70% footfall) • Lack of high value draws like theme/adventure parks, adventure sports hub, beachfronts, etc. and few circuit-based itineraries
Lack of basic amenities	• Sites exist as singular attractions rather than comprehensively developed destinations • Lack of basic amenities and services such as information centres, tour guides, accessible public washrooms, parking areas, etc.
Limited Connectivity	• Constrained airport capacity (30 flights per day), serving only 13 domestic and 2 international routes • Road and railway connectivity gaps hamper intra-region commute
Limited stay options	• VER's 4,500 rooms lack diversification with few budget and experiential stays options like camps, homestays and hostels • Nearly all 4+ star properties are concentrated in Visakhapatnam leaving other tourist destinations like East Godavri, ASR and Konaseema with virtually no star-rated accommodations

Aspiration for VER

In the 'Swarna Andhra @2047 Vision', the state has set an ambitious aspiration to elevate its tourism sector, shifting focus from volume-based religious tourism to more sustainable, high-value segments, targeting increase of its tourism sector GVA from the current $7-8 billion (4.6%) to $30-35 billion (8-9%) by FY32.

In line with the state's vision, this Economic Master Plan has set an equally ambitious vision of transforming VER into a renowned tourist destination by focusing on 4 prioritised thematic areas, aspiring to increase tourism GVA from the current $1-1.5 billion to $6-7 billion by FY32 while creating over 300,000-350,000 incremental jobs. Figure 57 below highlights the significant shifts in the KPIs required to achieve VER's vision:

Figure 57: KPIs for tourism growth

	From (FY24)	To (FY32)
Tourism GVA (in $ billion)	1-1.5	6-7
Total employment (in '000)	200	500-550
Average stay duration for tourists (days)	1-2	3-5
Average daily spend per tourist (INR)	1,700	8,000-12,000
No. of hotel rooms	4,000+	14,000
Foreign and high-end tourists	30,000-40,000	1.5 million

Proposed interventions to achieve VER's aspiration

To emerge as a renowned tourism destination, VER will have to develop 13 tourism hubs across 4 prioritised themes. In addition to focused development of these themes, providing best-in-class policy interventions, strengthening institutions capability, creating inventory of hotel rooms and marketing VER as a year-round tourism destination would also be critical unlocks to enable the sectors aspirational growth. The four prioritised themes that will drive tourism growth are:

Figure 58: 4 themes prioritised for tourism development

Theme 1: East India's coastal tourism hub

VER should focus on coastal tourism development across 3 sub-themes as shown below:

Figure 59: Prioritised sub-themes for coastal tourism development

1.1. Beachfront tourism

With a 520 km coastline and 30+ beaches, VER possess the natural foundation to emerge as the go-to beach tourism destination on India's eastern coast. The centrepiece of this beachfront tourism strategy is the development of Vizag Bay City, a transformative, 40 square kilometres, integrated mixed-use brownfield city, anchored on coastal tourism, artfully merging VER's beauty with a comprehensive suite of offerings including:

1. 5-7 master planned and developed beachfronts with over 3 blue flag beaches adhering to global standards for water quality, eco-friendly infrastructure, safety and accessibility
2. Assorted dining options including 50+ fine-dining and premium rooftop/ocean-view restaurants, 8-10 beach clubs and cafés, and 80-100 beach shacks
3. 2,000-2,500 rooms across diverse accommodation options: from eco-resorts, luxury hotels and sea-facing villas to budget hotels, hostels and bed and breakfasts. The proposed options should include 1) 5-star inventory of 450-500 rooms, 2) 3-to-4-star inventory of 750-1,000 rooms and, 3) non-star/budget inventory of 800-1,000 rooms
4. Recreational amenities such as open-air event venues, shopping complexes, well-lit boardwalks, cycling tracks and water sports zones
5. 10+ tourism hotspots like Kailasagiri, Thotlakonda, and a marina with 5-6 jetties etc.
6. An adventure/theme park spread across 75 acres, envisioned as a top-tier national experiential destination (further detailed in Theme 4)
7. Hosting of nationally and internationally acclaimed events such as Sunburn Vizag, and India yachting festival

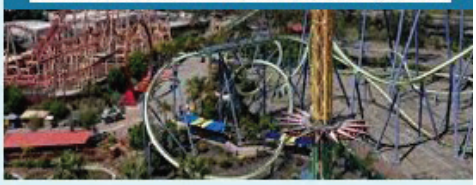
In line with global models like Miami's Bayshore Corridor and Dubai's Jumeirah Beach, the aspiration is to develop 25 km of prime coastline between Kailasagiri and Bheemili beach as a vibrant mixed-use city area as shown in Figure 60:

Figure 60: Concept note of Vizag Bay City mega project

Developing a 40 sq. km mixed-use brownfield city to transform 25 km of VER's prime coastline into a tourism centerpiece

5-7	Developed beachfronts
2,000-2,500	New hotel rooms
3+	Blue flag beaches
2,000	Area (acres) master planned in Phase 1
5-10	Proximate attractions such as Kailasagiri
6,000+	Premium/ luxury residential units

1 adventure/ theme park



80-100 beach shacks

50+ restaurants

1 marina with 5-6 jetties

2-3 shopping complexes

Water sports hub

Vizag Bay City mega project will include development of multiple destinations and experiences as sub-projects. One such example is the development of Bheemili beachfront, as shown in Figure 61.

Figure 61: Illustrative example of beachfront development at Bheemili

1.2. Water sports tourism

From the calm waters of Mangamaripeta, ideal for beginner scuba diving and kayaking, to the open sea at Rushikonda Beach, well-suited for jet skiing and parasailing, VER possesses a diverse coastline that can accommodate a wide spectrum of water sports. VER's beaches are already witnessing a steady increase in the number of water sports operators, supported by strong policy and institutional initiatives from the GoAP. The proposed Vizag Bay City should further accelerate this growth, with new marinas, jetties, and high-end tourism infrastructure.

To develop VER as one of the top 3 water sports hubs in India, the following interventions are suggested:

1. Earmarking Mangamaripeta and identifying 2-3 other beaches to be developed as water sports hubs
2. Inviting 30+ agencies and water sports operators to facilitate experiences and activities including but not limited to scuba diving, windsurfing, dinghy sailing, waterskiing and kayaking, dolphin and whale watching
3. Attracting a nationally/internationally recognised "water sports certifying institute" at Mangamaripeta Beach to make this an epicentre for professional training and certification, following the Andaman & Nicobar Island and Puducherry models

1.3. Cruise tourism

The Vizag International Cruise Terminal (VICT), inaugurated in 2023, has laid the groundwork for cruise tourism, yet its potential remains largely unrealised. With only 15 cruise calls annually, the terminal's activity has remained constrained due to the following factors:

- The cruise terminal's proximity to the port has resulted in a degraded approach road and a less-than-ideal ambience for tourist attraction
- Under-developed terminal proximate area lacking basic amenities such as F&B options and retail outlets
- The area immediately surrounding the terminal offers negligible tourist attractions for passengers to engage in if they choose not to travel to the city centre

Aspiration for VER

By undertaking the interventions mentioned in this report (such as the development of the Vizag Bay City), VER has the potential to emerge as a pivotal node in India's burgeoning cruise industry. VER should aspire to double its cruise calls by FY32 to emerge as East India's premier cruise tourism hub.

Proposed interventions to achieve VER's aspiration

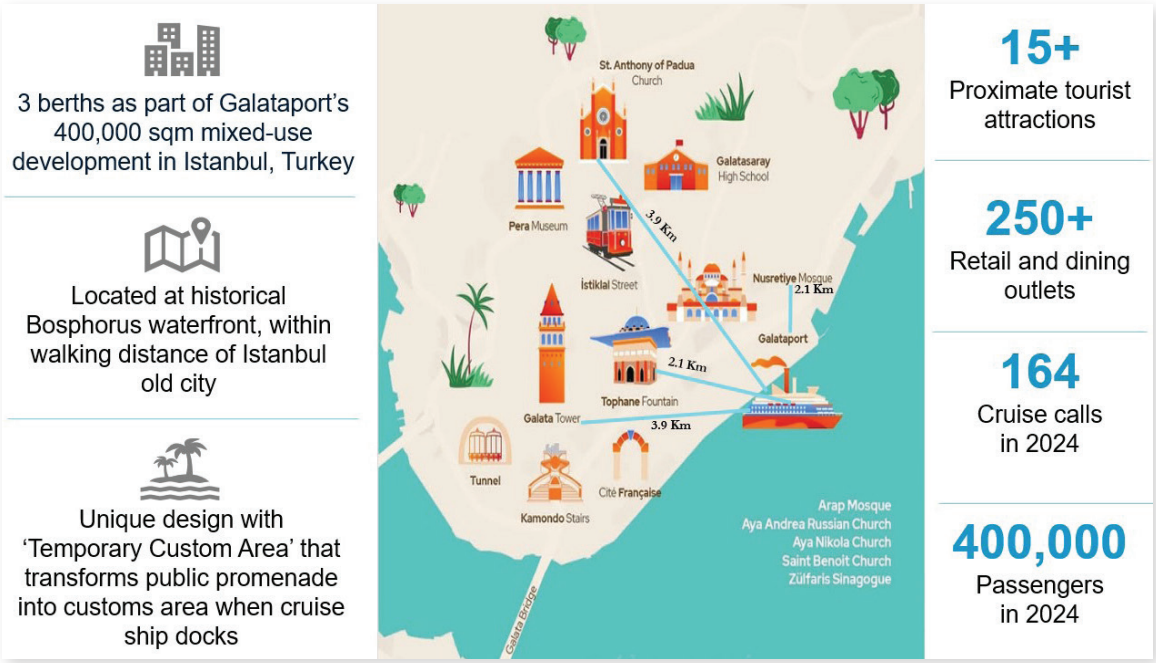
1. **Developing a variety of cruise offerings:** To build a strong ecosystem and increase cruise penetration, VER should build regional, national, and international cruise offerings including:
    - **Static and short-duration cruises:** Develop daily static or short-duration coastal cruises with onboard experiences such as dining and cultural shows
    - **Hop-on/Hop-off (HoHo) river cruises:** Develop 6-12 hours long hop-on-hop-off river cruises to regional attractions (e.g., Rajahmundry to Bhadrachalam, Kakinada to Dindi etc.), drawing inspiration from established short-duration cruise models like Turkey's Bosphorus cruise, and Amsterdam's canal tours. The key circuits proposed are as follows: 1) From Bhadrachalam to Rajahmundry, as a local site seeing cruise 2) From Kakinada to Dindi, as a backwater leisure cruise
    - **National circuits:** Launch 3-4 days national cruise circuits connecting Vizag to major east coast hubs in India like Chennai, Kochi and Puri, with curated shore excursions and attract domestic cruise liners like Cordelia and Angriya to run these circuits
    - **International connectivity:** Establish Visakhapatnam as a key spoke on the Southeast Asian cruise circuit, offering 6-12 days itineraries to destinations such as Singapore, Sri Lanka, and Thailand, through partnerships with global cruise liners such as Royal Caribbean and Princess Cruises

2. **Attracting 4-5 key cruise liners to add Visakhapatnam to their itineraries:** Attract cruise liners like Princess cruises, Royal Caribbean and Silversea to bring cruises to India, starting with at least 1-2 cruise calls per carrier/annum
3. **Developing seamless facilities and tourist attractions near terminals:** Ease of transition and proximity to tourist attractions are key evaluation factors used by cruise liners when adding new destinations to their routes

Turkey's rapid emerge as a critical node in the global cruise terminal ecosystem is a testament to the same. Figure 62 shows how the development of the Galataport cruise terminal as a mixed-use hub has made it a major cruise tourism destination receiving 164 cruise calls in FY24. Taking inspiration from this global benchmark, VER should:

- **Develop a 50-100 acres mixed-use tourism and retail complex near the cruise terminal:** This complex should feature amenities and attractions such as sea-facing cafés, premium restaurants, duty-free shopping, local handicraft markets, and cultural and tribal performance spaces. In addition, investment should be made to enhance the aesthetic appeal and infrastructure of the approach road to the cruise terminal
- **Design and promote a tourist map of proximate attractions:** Create a map of tourist attractions located near the terminal such as the Submarine Museum, Kailasagiri temple, and the proposed Buddhist Circuit sites, while ensuring last-mile connectivity through tour operators, the upcoming metro, and dedicated bus corridors
- **Facilitate e-visa on arrival:** Lastly, to reduce entry barriers for foreign tourists, VER should facilitate e-visa on arrival at the seaport

Figure 62: World-class amenities and tourism attractions at Galataport, Turkey



Theme 2: Emerging MICE tourism destination

Meetings, incentives, conferences and exhibitions (MICE) tourism represents a specialised segment within the broader travel and hospitality industry, serving business-oriented travel. India's MICE sector is rapidly emerging as a pivotal driver of economic growth and employment, positioning the nation as a significant player on the global MICE stage. The Indian MICE market is projected to more than triple from $11-13 billion in FY24 to $30-35 billion by FY32, reflecting a robust 13% CAGR driven by escalating demand from corporate, government, and knowledge-based sectors.[109]

Visakhapatnam already has the baseline infrastructure with 1,100 premium hotel rooms, India Expo Centre at Andhra Pradesh MedTech Zone (AMTZ) and an under-development East Coast Habitat Centre at Rushikonda (9 acres), located along Vizag's scenic beachfront. Over the last few years, Visakhapatnam has hosted various marquee events such as the G20 Summit Working Group Committee meeting (2023) and South India MICE Industry Leaders Connect (2025).

Despite having a decent ecosystem, Visakhapatnam's MICE market is currently at a nascent stage, valued at $50 million, representing less than a 1% share of the Indian market.

Aspiration for VER

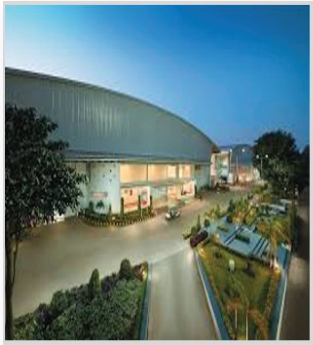
With its current endowments, upcoming international airport, growing hospitality and connectivity infrastructure, and competitive cost advantage, Visakhapatnam has the potential to emerge as one of India's top 10 MICE destinations and increase its share of India market to 2-5% to reach $0.6-1 billion by FY32.

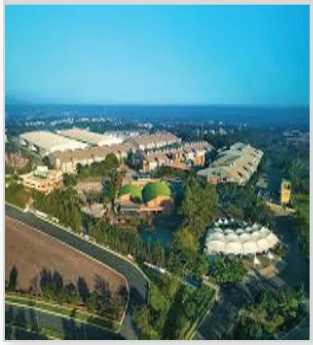
Proposed interventions to achieve VER's aspiration

The following interventions will be required to establish VER as an emerging MICE tourism destination:

1. **Exhibition-cum-convention centre near upcoming airport:** VER should establish a world-class exhibition-cum-convention centre at the upcoming Bhogapuram Aerocity, located near premium hotels and within walking distance of proposed metro stations. It should adopt best practices by taking inspiration from benchmarks like Bangalore International exhibition centre and Messe Frankfurt as detailed in Figure 63 and Figure 64

Figure 63: Bangalore International Exhibition Centre (BIEC)





57 acres
total expanse

77,200 sqm
Covered, column-less, AC space across 5 halls

1,400
seating capacity of Jacaranda, the largest hall

42 km
Distance from international airport

India's 1st
Certified green exhibition and conference facility

4 minutes
walk to Madavara metro station

Key highlights of Bangalore International Convention Centre

100% privately developed, owned, and operated by the an industrial association

Designed as a multi-facility center with halls of various sizes to host events like conferences, seminars, and meetings

Hosts large scale national and international fairs and conferences. Select events hosted in 2023-2034 include:

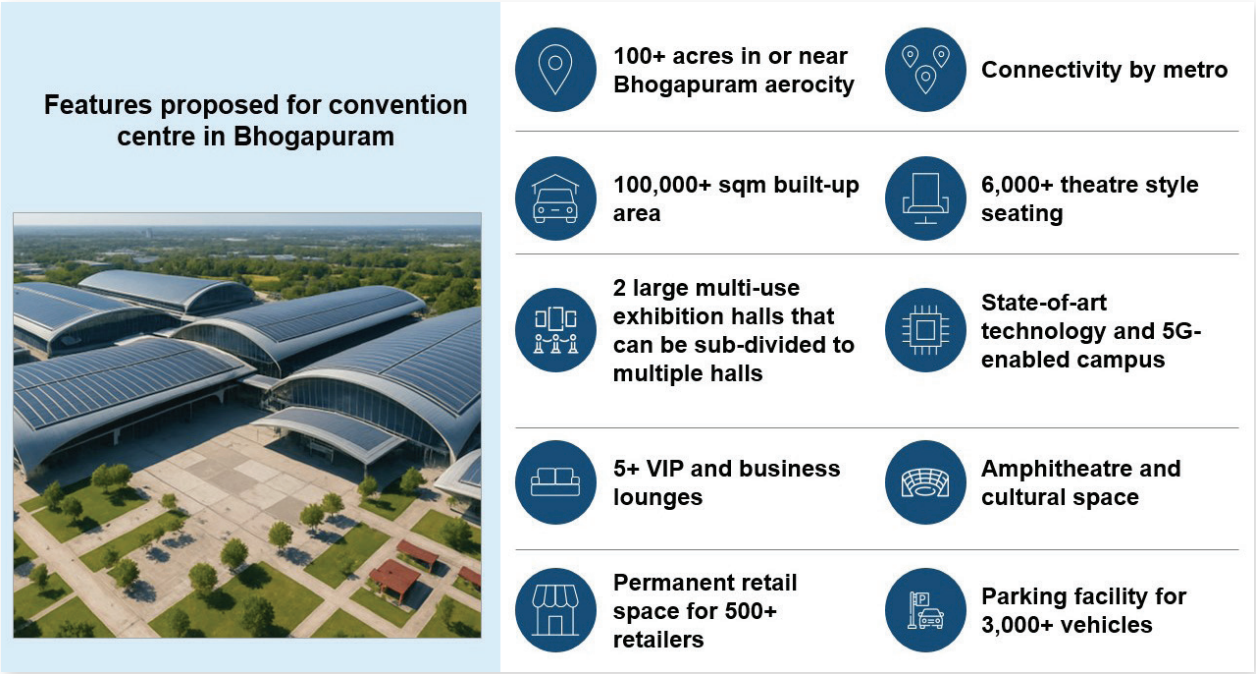
- 1st edition of India Energy Week, 2023
- STONA 2023, 15th international granites and stone fair
- EXCON 2023, South Asia's largest construction equipment fair
- DIDAC 2023, Asia's largest education and skilling exhibition

Figure 64: Messe Frankfurt

~100 acres (600,000 sqm)	400,000 sqm of built up space across a 11 multi-functional halls and 100+ conference halls
$0.8-1 billion revenue	Revenue earned by the convention centre in 2024 and 2,500 people employed directly
250+ events	Hosted annually at Frankfurt, from across 180+ countries and 28+ industries (technology, manufacturing, consumer goods etc.)
98,000 exhibitors	Across events, gathering 4.6 million visitors with 83% of exhibitors and 57% of buyers from outside Germany

The nodal agency should attract an industrial association to develop, build and operate this facility. This centre should be developed as an integrated exhibition-cum-convention centre spanning 100 acres, featuring a modular plenary with 6,000-8,000 seating capacity, expansive exhibition spaces and other nuances as detailed in the concept note given in Figure 65. The centre, if developed as planned, can aspire to host 100-150 events annually, ranging from high-profile events like G20, to large government and industrial conferences and expos.

Figure 65: Concept note for Bhogapuram exhibition-cum-convention centre



2. **Best-in-class institutional, policy and governance support:** In addition to establishing a world class exhibition-cum-conference centre, the following interventions are instrumental to support the growth of MICE tourism in VER:
   - Establishing a dedicated state/regional MICE promotion bureau to attract, coordinate, and streamline MICE events
   - Granting 'Industry' status to development of MICE venues to unlock cost-efficiencies and enhance operational viability
   - Offering best-in-class financial incentives, including rental subsidies for anchor events, to attract marquee conferences and exhibitions
   - Implementing a single-window digital permitting portal to simplify and expedite event approvals
   - Developing targeted skilling programs under the tourism mission to certify over 5,000 MICE professionals by FY32, ensuring adequate personnel availability
   - Attracting anchor state government and state agency events, with a commitment to host 20+ events (e.g. annual med-tech expo, international poultry expo) to build initial venue visibility and bridge viability gaps for new projects

Theme 3: Religious and spiritual tourism hub

VER has a rich network of over 60 Hindu and Buddhist religious sites, accounting for 60-70% (2023) of the region's tourist footfall. It hosts Godavari Pushkaram, the large-scale river festival and is home to renowned sites such as Kailasagiri, Simhachalam, Annavaram, and Srikurmam.

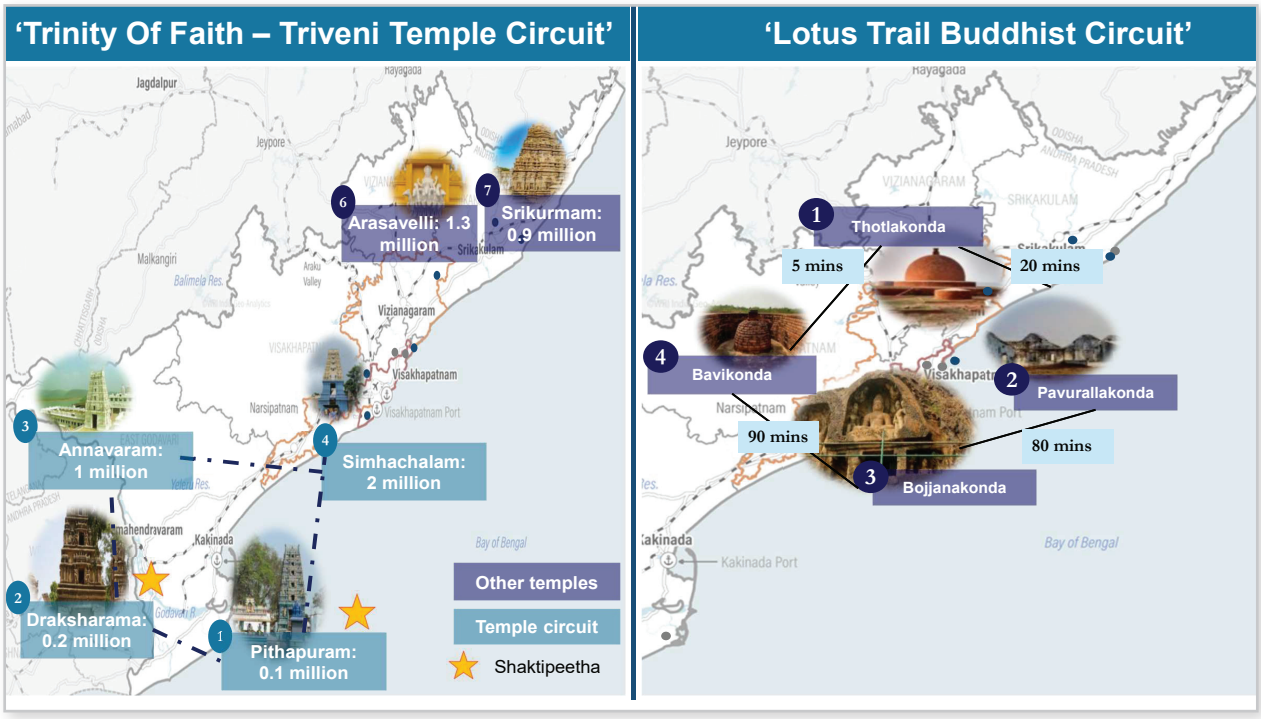
Despite the region's extensive portfolio of pilgrimage centres and heritage temples, several structural and experiential gaps have resulted in low-value tourism dominating the region. Some of the key challenges are as follows:

- Lack of temple proximate amenities such as budget accommodation, dining options, and last mile connectivity
- Absence of curated narratives and circuit-based itineraries limiting tourists to the pilgrimage sites
- Limited marketing and promotional effort for these destinations
- Few curated tours and religious/spiritual circuits in the region leading to shorter stays

While religious and spiritual tourism may exhibit a lower value per capita compared to the other themes identified for VER, its sheer volume and consistent demand account for a significant market opportunity.

With focused infrastructure and circuit-based development, VER can increase both the tourist inflow and the average length of their stay. 2 dedicated circuits and select additional sites are proposed to be developed to make VER a leading religious and spiritual tourism hub, as detailed in Figure 66.

Figure 66: Developing the Buddhist and temple circuits across VER



3.1. Developing the 'Trinity of Faith - Triveni' temple circuit

VER is home to some of the most revered temples in Andhra Pradesh, drawing millions of pilgrims each year. Sites like Simhachalam, Annavaram, Draksharamam, and Pithapuram hold deep spiritual significance.

Simhachalam, located near Vishakhapatnam, has an annual footfall of 2 million and is one of the eighteen 'Narasimha Kshetras' in India. It is revered as a major Vaishnavite pilgrimage site. The Annavaram temple located in Kakinada is a revered place of worship for Lord Vishnu, Goddess Anantha Lakshmi and Lord Shiva. Daksharamam located in Dr. B.R. Ambedkar Konaseema district is one of the Pancharama Kshetras (five sacred temples dedicated to Lord Shiva in Andhra Pradesh) and is also considered one of the Shakti Peethas along with Pithapuram in Kakinada.

These temples are not just places of worship but living symbols of the region's cultural and religious heritage. Together, these temples form a divine trinity of Shiva, Vishnu, and Shakti traditions, highlighting VER's potential to emerge as a unique religious go-to destination, branded as the 'Trinity of Faith' circuit.

Proposed interventions to achieve VER's aspiration

To develop this circuit the following interventions are required:

1. Developing 5-7 days budget tour packages in partnership with tour operators
2. Revamping temple proximate amenities such as walkways, toilets, parking, queue management, guide facilities and retail shops
3. Utilising the tourism promotion budget for developing the Trinity of Faith circuit as a global tourist pilgrimage by amplifying the folklore that highlights the significance of these sites
4. Promoting existing festivals such as the Godavari Pushkaram and creating new large-scale events and festivals to attract seasonal footfall
5. Addressing hotel room requirements for the temple circuit through planned capacity expansions in a 5 km radius from major temple nodes including:
    - 500 hotel rooms in East Godavari. Interestingly, 250+ hotel rooms are already planned for the region ahead of the Godavari Pushkaram
    - Creating 250 hotel rooms proximate to Daksharamam and Pithapuram
    - 200 of the 500+ rooms planned in Kakinada should be strategically located proximate the Annavaram temple
    - Simhachalam can be served through upcoming hotel stock in Bay City

3.2. Developing the 3-5 day 'Lotus Trail Buddha Circuit'

VER holds a profound place in the history of global Buddhism, with Andhra Pradesh often regarded as the cradle of Mahayana Buddhism. Sites such as Thotlakonda, Bavikonda, Bojjanakonda, and Pavurallakonda stand out as historic monastic hubs. Dating back over 2,000 years, these sites reflect both Theravada and Mahayana traditions, with stupas,

viharas, and inscriptions showcasing the region's spiritual, philosophical, and artistic heritage. Promoting these sites in VER as a standalone "Lotus Trail Buddha Circuit," offers a powerful opportunity to revive this legacy and establish the region as a leading Buddhist and spiritual tourism destination.

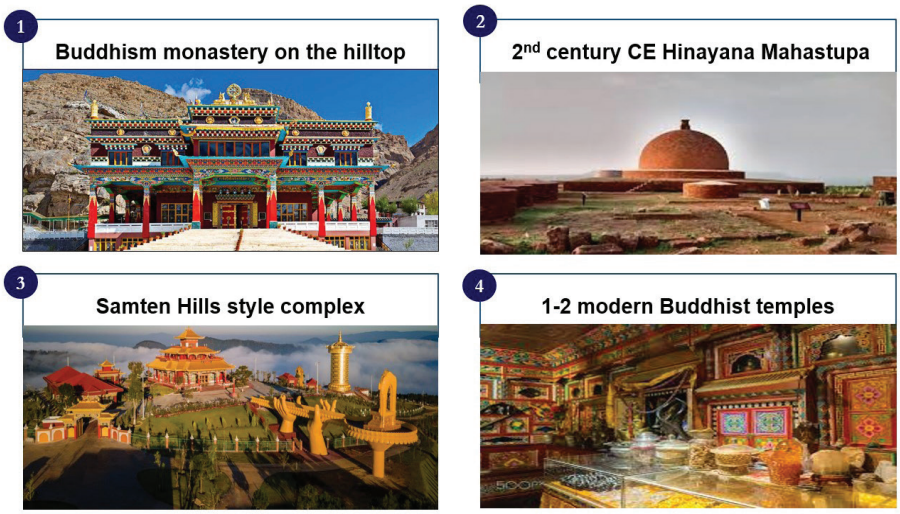
To develop this circuit, the following interventions are required:

1. Developing and promoting a wealth of historical sites, including ASI locations such as Thotlakonda and Bavikonda
2. Creating integrated experience allowing visitors to experience Buddhism as a living practice in the region through monastery and temple stays, meditation and wellness focused retreats etc.
3. Curating and hosting 3-4 mega events annually around Losar and Buddha Purnima
4. Developing 100-500 acres at Thotlakonda/ Pavurullukonda into a premier cultural and wellness tourism Buddhist city that fuses Hinayana Buddhist heritage with immersive wellness and meditation experiences. This development should be benchmarked against Samten Hills, Vietnam, a privately funded 220-hectare spiritual and cultural complex (Figure 67) and include amenities such as:
    - 2-5 meditation centres
    - A modern monastery at the hilltop
    - 1-2 Buddhist temples for daily worship and spiritual engagement
    - 10-15 acres Hinayana heritage zone
    - 200-300 wellness rooms
    - Commercial and retail complex including 5+ restaurants, shopping zones
5. Engaging Buddhist associations to drive investment and support the development of the proposed Buddhist city at Thotlakonda/ Pavurallakonda

Figure 67: Key highlights of Samten Hills, Vietnam

The concept for the Thotlakonda/Pavurallakonda Buddhist city is detailed in Figure 68.

Figure 68: Concept note for Thotlakonda Buddhist city



Theme 4: Immersive experiential tourism hub

The travel industry is experiencing a profound reshaping, driven by the ascendancy of experiential tourism and the rising demand for authentic, immersive engagement over passive sightseeing. This high-value segment, projected to reach $45 billion by 2027, represents a significant opportunity for VER. Leveraging its rich natural and spiritual sites alongside burgeoning amenities, VER is uniquely positioned to cultivate differentiated offerings, attract high-value travellers, and unlock substantial regional economic potential.

Proposed interventions to achieve VER's aspiration

To capitalise on this shift, VER should undertake the following interventions:

1. **Developing 8 experiential tourism hubs**: Master plan and develop 8 prioritised tourism sites into high-value experiential hubs (as detailed in Figure 70). Such initiatives are essential to build the market inventory required to attract a broader base of domestic and international visitors, enhance site distinctiveness, elevate visitor engagement, and significantly increase the average spend per tourist
2. **Identifying Destination Management Organisations (DMOs) for each of these 8 hubs:** Identify and allocate each of the 8 prioritised sites to one DMO each. The DMO will be responsible for end-to-end development, management and transformation of these hubs

A key experiential hub proposed is Kailasagiri, a cultural and leisure landmark located at the tip of the proposed Vizag Bay City. Currently featuring the iconic Shiva–Parvati statue, ropeway rides, and landscaped gardens, the site presents a promising foundation. It can be further developed into a renowned spiritual, wellness and adventure tourism hub by undertaking the developments highlighted in Figure 69.

Figure 69: Kailasagiri as a spiritual, wellness and adventure sports hub

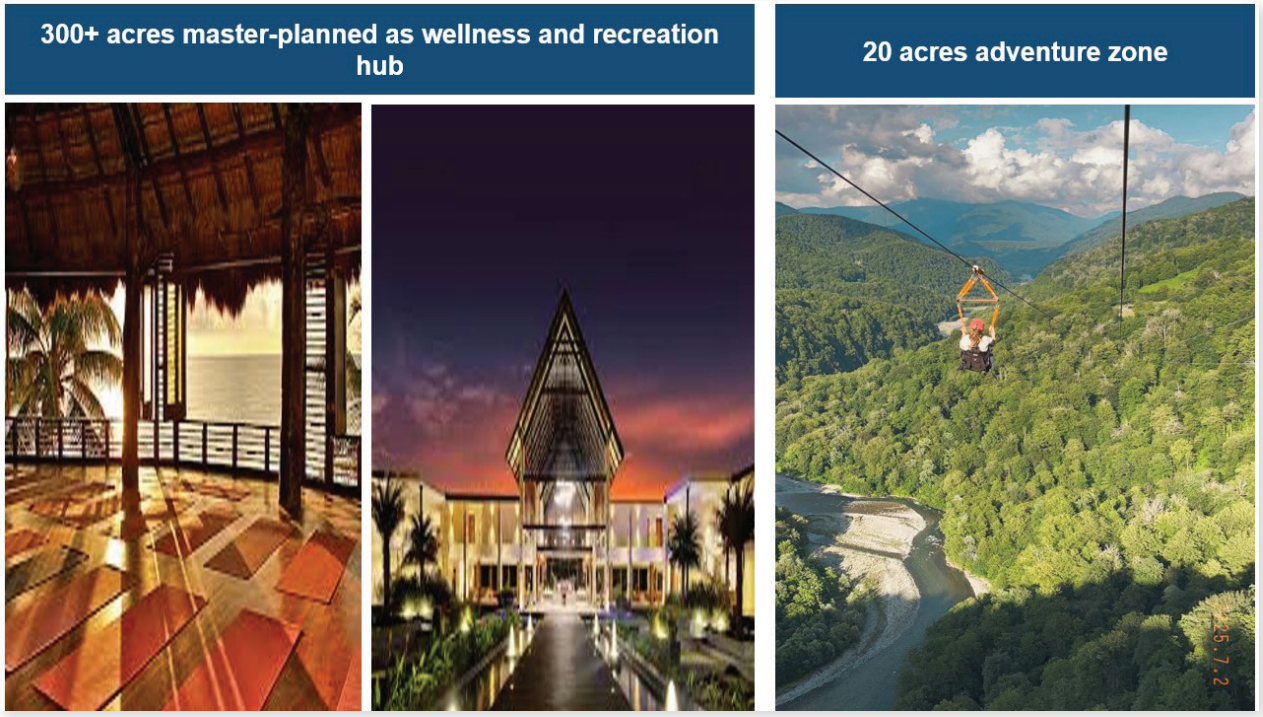
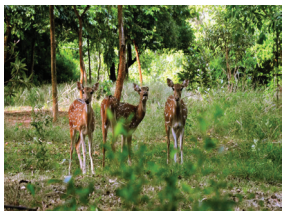
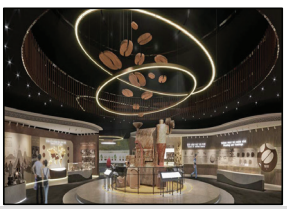


Figure 70: Experiential tourism hubs planned across VER

1 **World class adventure/ theme park**		Creating a world-class adventure park spread across 75 acres, designed as a premier destination offering thrilling experiences and immersive attractions for visitors of all ages
2 **Godavari Pushkaram**		Developing riverfront, creating 500-600 hotel rooms and earmarking glamping zones for upcoming Pushkaram. Further, creating a campaign to increase recall and generate regular footfall
3 **Kailasagiri**		Developing a 400 acres master planned wellness and recreation hub featuring resort rooms, a shopping complex, yoga retreats, and 10+ dining options
4 **Kambalakonda**		Leveraging the natural beauty of Kambalakonda, as an eco-tourism destination, featuring tree trails, scenic hikes, walking and cycling tracks, and enriching AR/VR nature experiences
5 **Borra caves**		Borra Caves to be revitalized under the Government of India's Swadesh Darshan 2.0 program, positioning it as a major attraction expected to draw 1.5 million tourists annually
6 **Lambasingi**		Positioning Lambasingi as the premier hill station of the East by developing glamping zones, 20 acres tent city, and 8-10 scenic trails that immerse visitors in its unique misty charm
7 **Etikopakka**		Using regional recall of Etikopakka to create a 200 acres experiential museum and hospitality complex with a wooden toy museum, luxury glamping domes and homestays
8 **Araku experiential tourism hub**		Creating an immersive experience centred on coffee and tribal culture, featuring 500-600 new hotel/other rooms, coffee tasting centers and 2-3 premium glamping sites with over 100 domes

Promoting an annual tourism calendar

In addition to development of the 4 thematic areas, establishing an annual calendar of diverse, high-profile events is critical to accelerating VER's tourism growth. Such a calendar will mitigate seasonality by creating sustained demand drivers, ensuring consistent year-round footfall and higher visitor spending. By institutionalising marquee events across cultural, recreational, and business tourism segments, the region can position itself as a premier, all-season hub for both domestic and international visitors. A sample tourism calendar for the region has been provided in Figure 71.

Figure 71: Proposed annual tourism calendar for VER

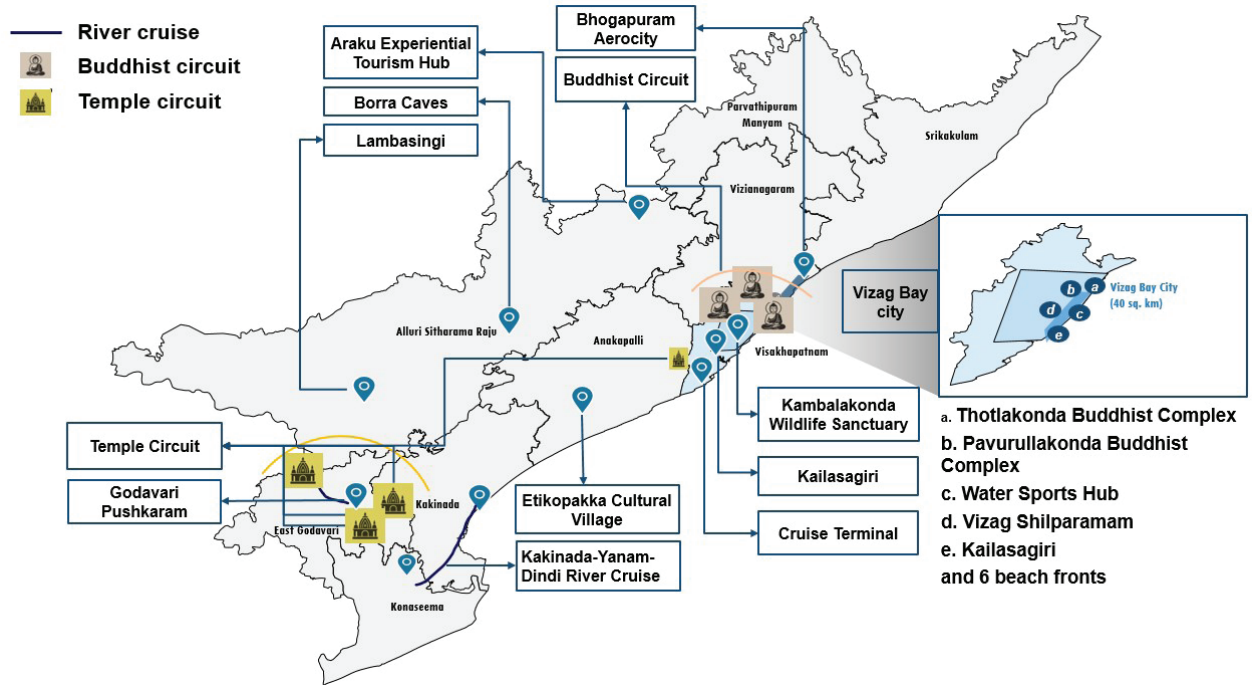
Land, investments and policy architecture

1. Land and geographical landscape

The 13 tourism hubs identified across the four prioritised themes would require 2,500-3,000 acres of tourism related land development. Over 2,000 acres of this land is available with agencies including VMRDA and APTDC. The remaining 500-1,000 acres will need to be acquired.

In addition to acquisition, the state government will also be required to prioritise zoning and notification of the proposed Vizag Bay City.

Figure 72: Prioritised sites and circuits for tourism development in VER



2. Investments

To achieve VER's aspirations, the region will require an infusion of $4-5 billion in investments, with 95% expected from private sector, across hotels, convention halls, development of sites and experiences.

3. Policy architecture

To position VER as a premier tourism hub, forward-looking operating guidelines to attract investment, and sub-sectoral policies for homestays, beach shacks etc. will be essential. Additionally, ₹150-200 crore budget allocation would be required for tourism promotion. These interventions are explained in detail in the chapter 'Projectisation, policies and institutional mandates.'

Growth Driver 5

National and international healthcare hub

Context

India's healthcare industry has established itself as a critical pillar of the nation's services sector, demonstrating sustained and robust growth. Employing 7-8 million[110] people, the industry was valued at an estimated $372 billion in FY23.[111]

Despite the sector's rapid growth, India faces an aggregate deficit in primary and secondary medical infrastructure, with a national average of just 1.03 hospital beds per 1,000 people (vs. WHO standard of 2) and a medical workforce of 3.4 per 1,000 (vs. WHO standard of 5).[112]

Cities like Chennai, Delhi, Mumbai, and Bengaluru have emerged as healthcare hotspots with good medical facilities (such as high concentration of hospital beds, skilled doctors, and nurses). This infrastructure, combined with multi-modal connectivity, has enabled these hubs to serve as critical medical destinations for patients seeking advanced care. India attracted 600,000 international medical tourists in 2023[113] and ranked amongst the top 10 medical tourism destinations globally.[114] However, this footfall is substantially below the country's strategic potential.

Andhra Pradesh's healthcare GVA is estimated at $2.6 billion and the state ranks amongst the top 3 states in terms of availability of doctors (1.6 per 1000 population)[115] and nurses (3.4 per 1000 population). However, the state falls short on availability of adequate physical infrastructure (1.4 beds per 1000 population).[116]

Despite the statewide deficit, VER already has best in-class institutional and infrastructural capacity with 30,000 hospital beds (2.1 beds per 1000 population), 25,000 active doctors (2.5 per 1000 population), and over 55,000 active nurses (4.8 per 1000 population).[117] This robust foundation is partly because of strategic forward looking infrastructural investments such as the 75-100 acres Arilova Health City in Visakhapatnam. One of India's first integrated healthcare ecosystem, housing 35 hospitals and 1,500 beds, the city has already become a significant draw for medical tourists, attracting between 200,000-300,000 domestic patients from neighbouring states like Odisha, Chhattisgarh, and Telangana, while also witnessing a smaller but consistent inflow of approximately 1,000 international medical tourists annually.

Key trends shaping the industry

Four paradigm shifts have significantly redefined the healthcare market and are expected to continue to be key drivers of the next phase of growth. These trends are:

1. Growing demand for medical tourism

- In FY23, the global medical tourism market was valued at $60 billion with 14 million tourists travelling across borders for medical treatment118
- India ranked amongst top 10 medical tourism destinations in Medical Tourism Index 2021. The sector was valued at $2.8 billion and attracted 600,000 international tourists in FY23.[118] The sector aspires to 3x tourist inflow to 2-2.2 million by FY32
- Patient base is expanding to include Central Asia and Middle East. Their share of patients expected to increase from 10-15% to 25-30% by 2030

2. Increasing share of dependent population

- The global population requiring care is expected to nearly double from 1.1 (2022) to 2.1 billion (2050). India's dependent population is projected to reach 190-200 million by 2032 and 350 million by 2050[119]
- While about 2.2% of India's population lives with a disability, this number rises sharply to more than 25% among people aged 60 and older[120]
- India's care services market size, valued at $29 billion in 2023, is projected to reach $85-90 billion by 2032, growing at a CAGR of 13.7%[121]
- Effective and affordable care including hospice, home care and community models like senior living villages are going to emerge as large service markets

3. Increasing focus on wellness and alternative medicine

- India is the global capital of AYUSH (Ayurveda, Yoga, Unani, Siddha, Homeopathy) and has a strong infrastructural and institutional ecosystem comprising of 3,800-4,000 hospitals, over 36,000 dispensaries, and over 750,000 registered practitioners[122]
- Growing trend of high-net-worth individuals from countries like Europe, US and Middle East travelling for wellness focused on longevity, immunity, and mental well-being

4. Healthcare workforce shortages opening export markets

- Ageing population and rise in chronic diseases is expected to have an estimated shortfall of 11 million health workers by 2030[123]
- India is the 2nd largest exporter of nurses globally. With the largest youth and second largest English-speaking population, India is well poised to emerge as a leading supplier of medical workforce for the world

Aspiration for VER

As part of the 'Swarna Andhra@2047' vision, the state aspires to become a global leader in healthcare providing universal, tech-enabled and affordable coverage across wellness, nutrition, and care systems.

In line with the state's vision and the region's endowments, this master plan envisions to make VER:

- A national and international affordable healthcare destination providing medical services, wellness and elder care for:
  - Domestic patients from neighbouring states of Chhattisgarh, Madhya Pradesh, Odisha, Jharkhand and Telangana
  - International patients with targeted focus on footfall from ASEAN countries and the 2.2 million Telugu diaspora
- India's leading medical talent engine, exporting healthcare workers globally

This transformation is projected to generate $3-4 billion in incremental GVA and create 100,000-150,000 new healthcare jobs for the region by FY32. Figure 73 highlights the significant shifts in KPIs required to achieve VER's vision:

Figure 73: KPIs for healthcare

	From (FY24)	To (FY32)
GVA (in $ billion)	1-2	4-6
Incremental hospital beds		5,000
Domestic medical tourists (in 000)	200-300	600-800
International medical tourists (in 000)	~1	100+
Doctors (in 000)	25	47+
Nurses (in 000)	57	200+
Healthcare worker exports (in 000)	<5	70-80

Proposed interventions to achieve VER's aspiration

1. Creating an integrated world-class care hub

To solidify VER's position into an international healthcare hub, VER needs to build on its existing ecosystem to create a 700-800 acres affordable care hub, drawing inspiration from successful global models that have demonstrated the value of integrated ecosystems that combine hospitals, medical education, and wellness, while enabling a truly global mixed-use ecosystem with hospitality and commercial zones.

Select global examples include:

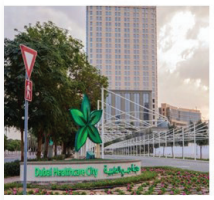
- Houston's well established 'Texas Medical Centre', attracting 10 million patients annually
- Dubai's rapidly emerging healthcare city (DHCC)

These examples have been provided as case studies in Figure 74 and Figure 75.

Figure 74: Texas Medical Centre, Houston (1925) - one of the largest hubs

Background	• Leading healthcare hub treating nearly 10 million patients annually • Graduates over 50,000 students annually
Size	• 9,000 beds across a 1,300+ acres medical complex employing over 100,000 professionals
Infrastructure facilities	• **Healthcare facilities** like MD Anderson Cancer center (700 beds), Texas Children's hospital (700 beds) • **Specialized centers** like Texas Heart Institute, B. Johnson hospital, Menninger Clinic etc. • **Research institutions** like Baylor College of Medicine, Texas Health Science and Cancer Centre • **Education facilities** like Houston College of Pharmacy, Texas Woman's University Institute of Health Sciences • **Other support** including diagnostics/laboratories, rehabilitation and therapy, pharmacies and medical supply, residential and commercial facilities, housing, retail/dining
Key learnings	• **Integrated model** including co-location of hospitals, education, and R&D drives scale and innovation • **Mixed-use planning** including housing, retail, wellness, and PPPs boost accessibility and commercial viability

Figure 75: Dubai Healthcare City (2002) - emerging new-age medical hub



Background	• Dubai Healthcare City (DHCC) is designed to be a comprehensive healthcare ecosystem, integrating healthcare services, medical education, and research facilities. • DHCC has over 195 clinics, 19 hospitals, 36 recreational zones and 4425 care professionals				
Size/ Area	• Over 500 acres (Phase 1: 70+, Phase2: 430+) • Over 5,000 beds across 2 phases				
Key offerings	• 19 Hospitals and 195 clinics • Advanced diagnostic centres • 50+ wellness/alternative medicine centres • Coworking spaces for doctors • Educational institutions	• Laboratories and research centers • 50+ one day surgery centers • Residential complexes and urban lifestyle			
Commercial hooks	**Designated as free zone**	**Strategic partnerships**	**Regulatory fees**	**Infra facilities in PPP model**	**Govt. support funding**
Key learnings	• Free zone area offering special economic incentives to attract anchor, other investors • Timely integration and focus on creating ecosystem for preventive wellness • 10-year golden visa and provision of co-working spaces for doctors,				

The proposed 700-800 acres care hub should be proximate to the upcoming Bhogapuram International airport. It must be a contiguous, non-encroached parcel with clear zoning for healthcare and institutional use and have access to core infrastructure. It should be located outside flood or eco-sensitive zones. Proximity to universities or tourism corridors can further enhance its appeal to anchor investors.

The vision for VER should be to become a globally benchmarked medical and healthcare hub comprising not just a cluster of hospitals, but a mixed-use, affordable hub with world-class care and a full ecosystem of supporting amenities, demarcated into 5 zones as highlighted in Figure 76.

Figure 76: Zoning of the proposed integrated care hub

1.1. Hospital zone (100 - 150 acres)

The nucleus of this hub would be a well-planned hospital zone spread across 100-150 acres. This zone will be home to 15-20 hospitals of national and international repute housing 5,000-7,000 beds. Key elements to aspire for in the hospital zone include:

1. 2-3 world-class JCI accredited hospitals
2. 2-3 internationally recognised hospital chains like Mediclinic, Cleveland
3. 5-10 one day surgery centres with organ donation banks
4. 3,000+ beds focused on 4-6 specialties including pulmonology, cardiovascular surgery, oncology, neurology, nephrology and fertility
5. 100% digital integration of patient journey including tele-medical pre-admission

support, AI-based e-prescriptions, post-operative digital rehabilitation for international patients etc.

6. Adequate ancillary ecosystem including clinics, diagnostic labs, and pharmacies
7. A dedicated association to promote medical value tourism
8. 24/7 international patient helpdesks

1.2. Medical education, skilling and research zone (250- 300 acres)

VER would like to emerge as a global skilling engine for medical workforce. To meet regional demand and cater to international requirements, VER aspires to add 25,000 trained doctors and 150,000 nurses to the workforce by FY32. About 80-90% of this workforce will be domestically deployed. To enable this, the zone would require:

1. 2 new medical colleges adding 500 annual MBBS seats
2. 10-12 new nursing colleges adding 1,500 annual nursing seats
3. A skilling university (5 acres) to address domestic shortage of allied healthcare professionals in fields like audiometry, speech, occupational therapy, perfusion, and MRI
4. An institute of paramedical sciences as proposed under 'Swarna Andhra @2047' vision

1.3. Senior care village (50-75 acres)

Andhra Pradesh is facing a significant demographic shift, with its elder population projected to grow from 13% in 2023 to 23% by 2047; significantly above the national average of 18%. This presents not just a challenge but an opportunity for VER to redefine elder care in India.

VER can position itself as one of the country's top five retirement destinations by developing a 50-75 acres retirement and elder care zone in the heart of its upcoming integrated healthcare hub. The master plan envisions creation of two to three senior living complexes, co-located with essential medical and lifestyle infrastructure including nursing homes, physiotherapy and rehabilitation centres, hospice-at-home units, and 24x7 emergency response systems. Interwoven with lifestyle amenities such as temples, meditation halls, dining areas, clubhouses, nature trails, and walking paths, these destinations will provide not just comfort but a sense of purpose and community. VER can take inspiration from:

- **Ashiana Amodh, Pune:** Senior living community, spread over 11 acres with 30% landscaped green area, featuring age-friendly homes, 19,000 sq. ft. clubhouse, wellness gardens, hobby zones, walking trails, sport facilities, and safety provisions like grab rails, wheelchair access, rescue systems and 24×7 medical support
- **Antara, Dehradun:** Ultra-premium senior living community catering to high-net-worth

families; offers luxury apartment, top-tier healthcare, landscaped gardens, activity centres, and concierge services

- **International examples:** Integrated communities such as 'The Villages' in Florida with over 100,000 retirees, and 'Erickson Senior Living' campuses, which offer continuum care along with recreational spaces, are thriving elder care communities

To unlock this opportunity, VER will need to attract 1-2 anchor private players in senior living. This requires policy changes, including single-window approvals for all senior living projects to reduce development cycle from the current 4-5 years to 2-3 years, as well as other well-designed incentives

Figure 77: Case Study of Antara senior living in Dehradun

1.4. Wellness zone (75-100 acres)

The 'Swarna Andhra@2047' vision aims to establish the state as a global leader in affordable healthcare, with a specific focus on wellness and AYUSH. VER aspires to fulfil this vision by creating 75-100 acres of dedicated wellness zone in the integrated care city. VER will serve as an integrated hub for preventive, curative, and experiential healthcare, blending traditional wisdom with modern wellness tourism infrastructure. This zone would require:

1. A 300-500 room wellness resorts ecosystem focused on evidence-based naturopathy treatments, preventive care, lifestyle management, integrative diet-based healing approaches, and spa therapies
2. 1-2 institutions like the National Institute of Naturopathy (NIN) in Pune, focusing on research, clinical trials, yoga, ayurvedic pharmacy, and drug testing
3. 1 naturopathy hospital and wellness retreat modelled on Jindal Naturecure Institute (JNI), Bangalore offering drugless treatment

1.5. Lifestyle and community zone (150 acres)

To support the vision of a vibrant and inclusive healthcare ecosystem, VER will develop a mixed-use residential and commercial zone that ensures liveability, affordability, and convenience for all stakeholders. The zone will include:

1. 4,000 affordable homes
2. Dedicated dormitories for students, nurses, and allied health workers, enabling seamless co-living near medical and educational institutions
3. Malls, restaurants and food courts to serve the lifestyle needs of residents, hospital visitors, and tourists
4. Over 1,000 room keys ranging from non-star and star-rated hotel rooms to apartments for longer stay durations to accommodate domestic and international patients and their families
5. 1,000-2,000 premium/luxury housing units to attract high-income residents and medical professionals seeking long-term residence within a world-class care ecosystem

2. Emerging hub for global medical workforce exports

By FY32, the region can aspire to train and export 70,000-80,000 medical workers, including 15,000-20,000 nurses, 25,000-30,000 allied health workers, and 30,000-35,000 auxiliary and support staff.

This is estimated to generate $500-700 million in annual remittance flows (Figure 78), transforming VER into a global medical talent powerhouse by FY32.

Figure 78: Aspirations from global medical skilling hub

	Nurses	Allied health workers	Other auxiliary staff
Exports till FY32 (in 000)	15-20	25-30	30-35
Total income for global workers (in $ million)	1,000-1,200	1,000-1,200	60-80
Remittance income potential (in $ million)	400-500	100-200	<10
Potential key employing nations			

In addition to the ‘medical education, skilling and research zone’ proposed as part of its integrated care city, to emerge as a global engine for medical talent, VER will also have to:

1. Sign government-to-government MoUs with countries anticipating major healthcare worker shortages like the UK, Japan, and the US to facilitate international internships, certifications, faculty/student exchanges, and centralised placement drives

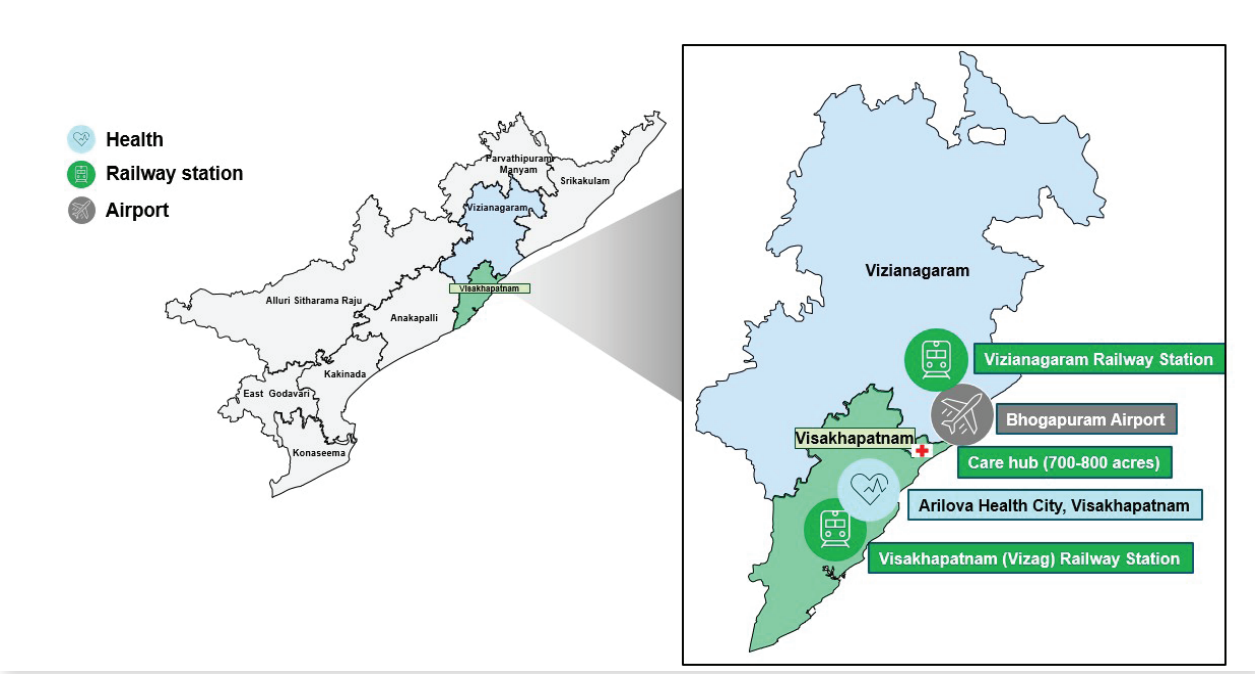
2. Lead the formation of a global/regional medical consortium, to implement internationally recognised curriculum standards for in-demand medical professionals
3. Integrate modern competencies like digital health, technology integration and foreign languages as electives
4. Establish an overseas medical talent placement unit to streamline securing international internships and jobs

Land, investments and policy architecture

1. Land and geographical landscape

Developing an affordable international care hub near Bhogapuram airport in Vizianagaram will require 700-800 acres of land. 400-450 acres of this land is available with the revenue department, while the remaining land will need to be acquired.

Figure 79: Geographical representation of the proposed care hub



2. Investments

To materialise VER's aspirations, the region will require an infusion of $3-4 billion in investments. 90-95% of the assets will need to be attracted from the private sector for the development of hospitals, senior living residences, educational institutions, wellness resorts, and other mixed-use city components, such as housing, hospitality, and retail.

3. Policy architecture

To establish VER as a national and international affordable healthcare hub, we must implement a robust policy framework specifically designed to attract investment in hospitals, medical colleges, senior living, and wellness centres. This requires developing targeted sub-sectoral policies and operating guidelines, particularly for streamlining medical tourist visas, securing bilateral agreements for medical value tourism, and governing healthcare worker exports.

Growth Driver 6

Planned urbanisation and housing

Context

In the past few decades, several urban areas across India have expanded organically, often without the benefit of Economic Master Planning, resulting in haphazard and fragmented urban development.

VER, as envisioned in this Economic Master Plan, aims to embark on an ambitious new phase of urban growth, with an opportunity to pursue urbanisation in a structured and planned manner. The objective is to ensure a high quality of life, equitable economic opportunity, and affordable living for residents.

Anchored in the seven growth drivers identified in this plan, the region is targeting the creation of 1.6-1.7 million incremental permanent jobs (out of a total 2-2.4 million jobs projected) by FY32.

To sustain this scale of economic transformation and to attract and retain talent, VER must reimagine its urban footprint. Rather than allowing sprawl and exclusion, the focus should be on building a region recognised for high-quality housing and world-class urban amenities. This growth driver sets out an integrated strategy to position VER as one of India's most talent-ready and future-facing economic regions.

Aspiration for VER

As part of this Economic Master Plan, VER aspires to emerge as one of India's most well-planned, talent-ready, future-facing economic regions with best-in-class urban infrastructure, connectivity and amenities. This growth driver is projected to generate $6-7 billion in incremental GVA and create 200,000-300,000 construction jobs by FY32.

Implementation of the seven growth drivers will result in the creation of 15 planned cities and will entail the creation of a significant physical footprint by FY32 as highlighted below:

- 650,000-750,000 housing units
- 10,000 additional hotel rooms across star ratings
- 15-20 innovation centres including incubators, accelerators and COEs
- 15-20 additional colleges across medical, IT and skilling
- 5000+ additional hospital beds across public and private hospitals
- 45,000-50,000 acres of additional industrial area
- 45-50 million square feet of additonal office spaces (mainly for IT) across services hubs and TODs
- 50-60 million square feet of additional warehousing space across hubs

These upcoming 15 cities should be transformed into world-class mixed-use hubs with affordable housing and best-in-class urban facilities such as walking cities and amenities for talent attraction.

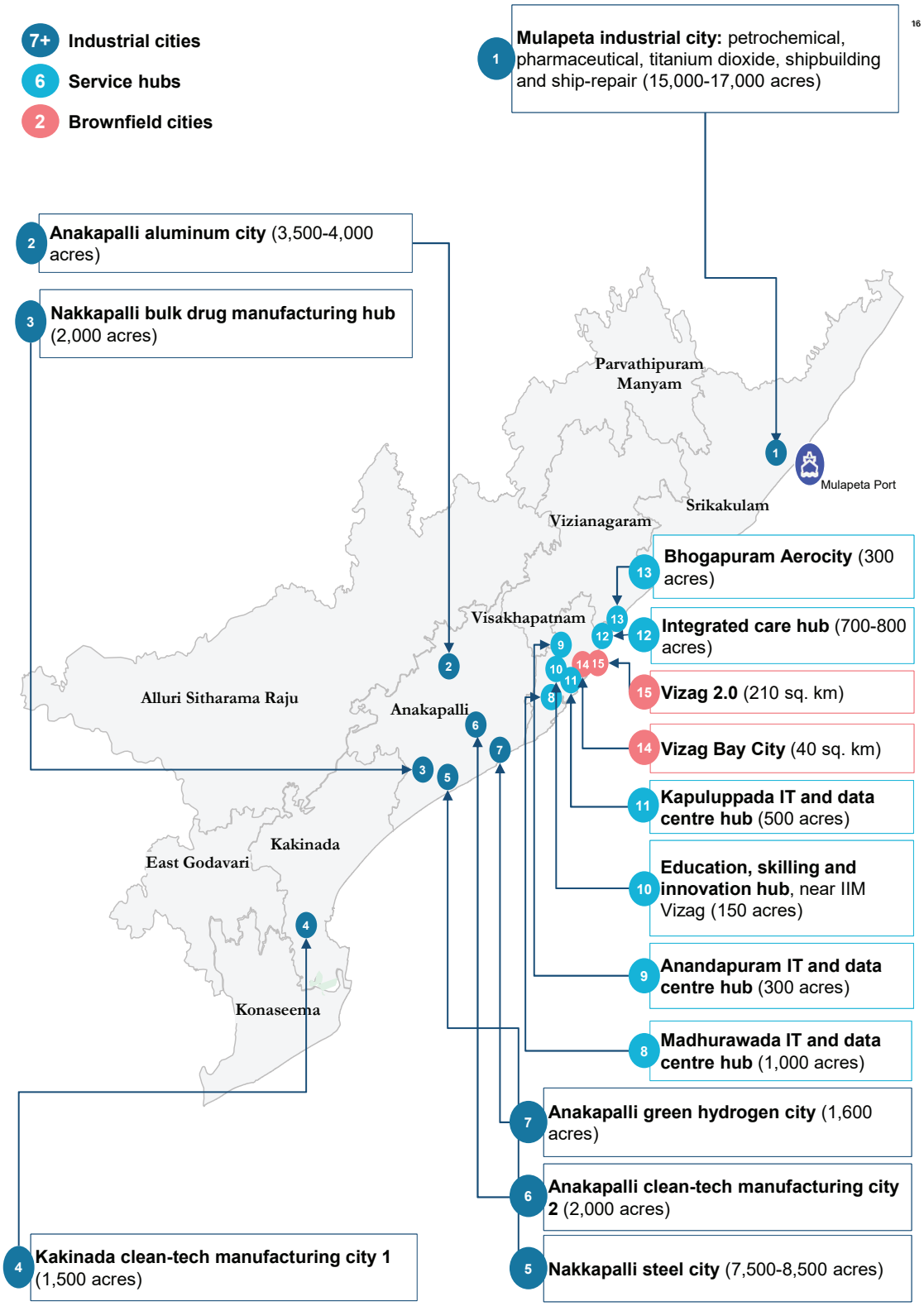
Proposed interventions to achieve VER's aspiration

This growth driver has been distilled into 4 recommendations as detailed below:

	1. Create 15+ planned cities
	1.1. Create at least 7 mixed-use industrial cities (rather than industrial estates)
	1.2. Develop 6 mixed-use services hubs
	1.3. Master plan 2 large brownfield cities
	2. Redevelop 130,000 slum households
	3. Undertake cluster redevelopment of 6-8 dense areas
	4. Undertake Transit Oriented Development (TOD) near 10-12 stations

Figure 80 shows the geographical representation of the 15 planned cities, proposed as part of this Economic Master Plan.

Figure 80: Geographical representation of the 15 proposed cities



1. Creating 15 planned cities

The 1.6-1.7 million permanent jobs envisioned in this Economic Master Plan, will be created across 15 upcoming manufacturing and services hubs. Historically, job-creating hubs in India have been poorly planned, often lacking integration with housing, transport and essential quality-of-life infrastructure. This has resulted in unorganised, fragmented peripheral development, often lacking critical amenities such as waste management, reliable connectivity, and diverse housing options such as affordable housing, studio apartments, dormitories, rental options and premium housing.

VER has the opportunity to change this paradigm by developing its 15 upcoming hubs into globally benchmarked, integrated mixed-use cities, combining economic growth with housing, mobility and essential urban services cohesively.

Amenities for Liveability and Talent Attraction (ALTAs) should be incorporated in the upcoming cities. ALTAs (as depicted in Figure 81) refer to the crucial last mile amenities necessary for making the city liveable and attracting/retaining talent. Though they require less than 10% of the capital investment required in the core infrastructure projects, they are invariably neglected or deprioritised by municipal bodies/ development authorities.

Figure 81: 9 critical Amenities for Liveability and Talent Attraction (ALTAs)

Another critical component will be the creation of a robust housing ecosystem with 650,000 to 750,000 new housing units across the 15 planned cities as detailed in Figure 82. To meet the needs of the increasingly mobile and diverse workforce, the housing stock should offer a wide range of options, going beyond the development of standard units for families. This should include low-income family housing, rental options such as co-living spaces, worker dormitories and hostels, and other accommodations for young professionals.

Figure 82: The 15 planned cities and their housing requirement

Category	Particulars of the 15 planned cities	Housing units (In '000)
7+ Industrial Cities	1. **Mulapeta industrial city:** 15,000-17,000 acres (petrochemicals, pharmaceuticals, titanium dioxide, shipbuilding and ship-repair)	50-55
	2. **Anakapalli aluminum city:** 3,500-4,000 acres	8-10
	3. **Nakkapalli bulk drug manufacturing city:** 2,000 acres	10-12
	4. **Kakinada clean-tech manufacturing city 1:** 1,500 acres	3-5
	5. **Nakkapalli steel city:** 7,500-8,500 acres	25-30
	6. **Anakapalli clean-tech manufacturing city 2:** 2,000 acres	6-8
	7. **Anakapalli green hydrogen city:** 1,600 acres	6-8
6 Services Hub	8. **Madhurawada IT and data centre hub:** 1,000 acres	30-35
	9. **Anandapuram IT, data centre and AI hub:** 300 acres	40-45
	10. **Education, skilling and innovation hub, near IIM Vizag:** 150 acres	5-10
	11. **Kapuluppada IT, data centre and AI hub:** 500 acres	70-80
	12. **Integrated national and international care hub, near Bhogapuram airport:** 700-800 acres	50-55
	13. **Bhogapuram Aerocity:** 300 acres (integrated services hub anchored on MICE tourism and aircraft MRO)	15-25
2 Brownfield cities	14. **Vizag Bay City** (40 sq.km)	90-100
	15. **Vizag 2.0** (210 sq.km)	
Total across 15 hubs		**450-540**
Other Housing	1. Cluster redevelopment and TOD	75-80
	2. Slum redevelopment	130
	3. Other standalone developments like industrial parks, Grade A office spaces etc.	60-65
Total		**650-750**

Additionally, initiatives such as 50% wastewater recycling at the tertiary level, plastic recycling, green buildings and energy efficient infrastructure will make these cities more sustainable and cleaner. The creation of transit hubs with last-minute connectivity, will be crucial to ensure that the workforce can seamlessly commute for work and leisure. Planning good transport in these cities will be critical. With all these aspects coming together, VER has the potential to create thriving world-class cities, crucial to driving economic growth.

1.1. Create 7+ mixed-use industrial cities (instead of industrial estates)

At least 7 hubs have been identified as upcoming industrial cities. These hubs are expected to create 600,000-700,000 incremental jobs which in turn will create demand for 150,000-190,000 housing units across different categories as detailed in :

Figure 83: Upcoming industrial cities and their housing requirements

Proposed industrial cities
1. Mulapeta industrial city: (petrochemical, pharmaceutical, titanium dioxide, shipbuilding and ship-repair)
2. Anakapalli aluminum city
3. Nakkapalli bulk drug manufacturing hub
4. Kakinada clean-tech manufacturing city 1
5. Nakkapalli steel city
6. Anakapalli clean-tech manufacturing city 2
7. Anakapalli green hydrogen city
8. Other standalone industrial parks/ zones (such as 500 acres MedTech zone 2.0)
7+ industrial cities

Housing units by category (in'000)	
40-50	**Dormitories / worker housing units for blue collar workers**
60-65	**LIG housing units**
5-10	**Co-living units / studio apartments**
15-20	**Apartments for young families**
25-30	**Apartments for middle management**
5-10	**Premium housing for senior management**
150,000- 190,000 housing units	

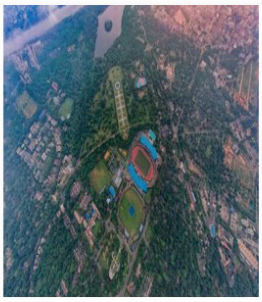
VER should strive to develop each of these nodes as mixed-use industrial hubs by adopting principles of effective master planning of industrial cities (Figure 84) and taking inspiration from best-in-class examples like Jamshedpur, an important steel cluster in India that continues to be a leading benchmark of a strategically planned, mixed-use industrial city in India (Figure 85).

Figure 84: Principles for effective master planning of industrial cities

FROM		TO
Plot by plot allocation and creation of only core office spaces with limited/no supporting infrastructure	Master planning	Planning in a holistic and integrated manner
Unorganised and sporadic development of housing near the job creating hubs	Diverse housing options	Worker dormitories, hostels, co-living, LIG units, housing for talent attraction and premium units planned systematically
Lack of ALTAs needed for a functioning city	Amenities for Liveability and Talent Attraction (ALTAs)	ALTAs such as schools, hospitals, open spaces, retail and entertainment included as mixed-use components
Lack of connectivity to and within the industrial hub	Transportation	Intra-city and inter-city transit including buses, e-rickshaws, walkways, metro, rail, road
Lack of recycling	Circularity	Wastewater treatment, plastic recycling, zero discharge model
Lack of common utilities	Utilities	Common utilities such as steam, water, effluent treatment facilities

Figure 85: Jamshedpur - India's mixed-use industrial city

Mega steel Hub	Home to Tata Steel's 12 MMTPA steel plant, employing over 30,000 people
Privately managed city	Spread over 150 sq. km, managed by JUSCO (a Tata Steel subsidiary)
Planned housing	250,000 houses master-planned in a walk-to-work concept
Education & sports	Hosts XLRI, one of India's oldest B-schools, and 24,000 seat capacity JRD Tata Sports Complex
Eco-friendly	Over 33% of the city is green cover; Jamshedpur frequently ranks in India's top 10 cleanest cities (Swachh rankings).



In addition to the principles stated above, the following considerations should also be kept in mind:

- Earmark 25-30% area of the proposed industrial city for mixed-use development (housing, retail, entertainment)
- Ensuring centralised, singlewindow regulatory approvals for the overall city
- Creating best-in-class plug-and-play infrastructure with shared facility inclusions like R&D, incubation spaces, coworking zones, working housing etc.
- Providing global FAR to give developers the flexibility to master plan and develop high-density housing and other amenities
- Minimising cost of doing business through affordable power and logistics costs
- Allowing electricity distribution franchisee for the industrial cities in order to provide affordable and reliable power

1.2. Create 6 mixed-use service hubs

The 6 upcoming service hubs across VER should also be developed into mixed-use cities. The upcoming 1 million jobs across the 6 services hubs will create demand for 210,000-250,000 housing units across different categories as detailed in Figure 86.

Figure 86: Upcoming service hubs and their housing requirements

Proposed services hub	Housing units by category (in'000)	
1. Madhurawada IT and data centre hub	30-35	Dormitories for entry level workers
2. Anandapuram IT, data centre and AI hub	40-45	LIG housing units
3. Education, skilling and innovation hub, near IIM Vizag	5-10	Co-living units / studio apartments
4. Kapuluppada IT, data centre and AI hub	70-80	Apartments for young families
5. Integrated national and international care hub, near Bhogapuram airport	50-55	Apartments for middle management
6. Bhogapuram Aerocity	15-25	Premium housing for senior management
6 services hub	210,000- 250,000 housing units	

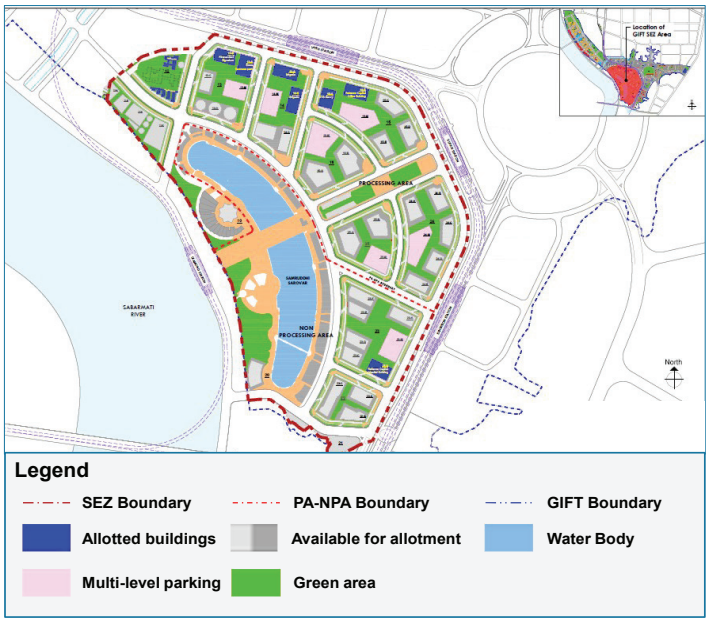
VER should strive to develop each of these nodes as mixed-use cities by adopting the principles of effective master planning of service hubs (Figure 87) and taking inspiration

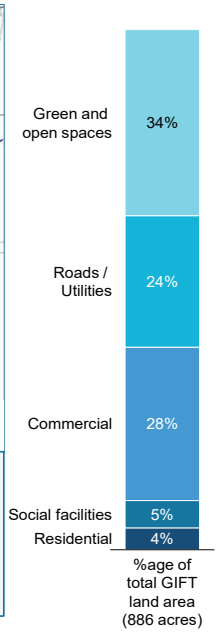
from best-in-class examples. GIFT city in Gujarat is emerging as a good example of a well-planned world class mixed-use services hub in India, as detailed in Figure 88.

Figure 87: Principles for master planning liveable cities and services hubs

Principles	Illustrative elements
15-min walking city	• 8-10% area under grid-iron pattern of streets • Mandatory street elements such as footpaths, subways, soft and hard-scaping • Well-planned amenities including electricity, water, sewage, drainage, waste
Accessible public spaces	• Ensure 12-14% area reservation for open green spaces. For instance, GIFT city has 24% area earmarked for the creation of state of art utilities and green spaces
Amenities for Livability and Talent Attraction (ALTAs)	• Public spaces like parks, gardens, lakes • Recreational amenities like sports complex, play-zones, event venues etc. • Social amenities including schools, creches, hospitals, places of worship • Retail (Mall / High-Street)
Planned mixed-use development	• Mixed-use plan with residential, commercial, retail, hospitality etc. • Housing plan across categories including worker dormitories, student housing, women hostels, senior homes, affordable housing, premium housing etc.
Differentiated land allotment	• Attract anchor investors through preferential allotment • Amenity plots to be allotted at subsidised rates / discounts

Figure 88: Case Study - Gift City, Gujarat





Key Highlights

Clean street grid network

Boundary less built-to-line spaces

State of art utilities and amenities including India's first automated waste management, smart water infrastructure, utility tunnel, district cooling etc.

Walk to work concept with mixed-use spaces

Provision of ALTAs as part of the master plan

Provision of affordable housing/transportation as part of master plan

In addition to the principles stated above, special attention needs to be made to provide inclusive housing for the young professionals and women workforce, across both industrial and service hubs as detailed in Figure 89.

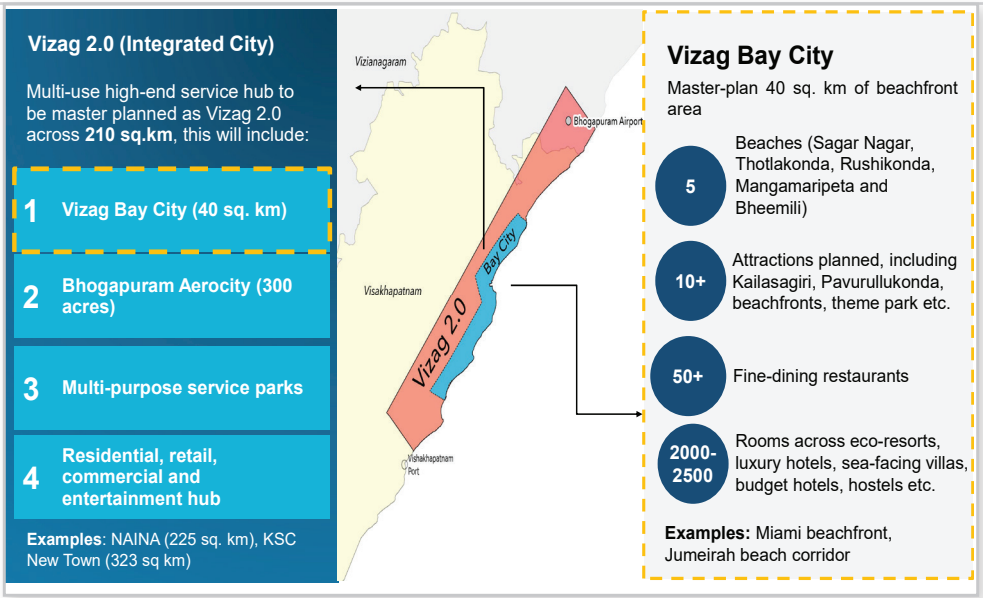
Figure 89: Special focus on housing for young professionals and women

1. **Young professionals:** 500,000 young professionals in the age group of 18-30 years are expected to join the workforce in VER by FY32. Housing solutions catering to their needs will be required to attract and retain talent, such as modern hostels/ studio apartments with:
   - Ready-to-move-in rooms with basic furnishings (bed, wardrobe, ACs)
   - Amenities such as Wi-Fi, housekeeping, indoor games, gym, etc.
   - 30,000-40,000 co-living units/ studio apartments units required across VER
2. **Women workers:** VER should aim to create 500,000 additional jobs for women (of the total 2-2.4 million jobs), increasing its female LFPR from 42% to 46%, and women's share of the workforce from 22% to 27% by FY32. Dedicated infrastructure will be needed to facilitate this increase including:
   - **Dedicated dormitories for women:** 25,000 units should be constructed and reserved for women
   - **Modern hostels/ studio apartments:** 15,000 studio/service apartments should be constructed and reserved for women
   - **Dedicated public infrastructure** including buses, creches, and toilets for women should also be created across the region

1.3. Master plan and develop 2 large brown-field cities

To ensure that the next phase of expansion of the Visakhapatnam city region is undertaken in a planned manner, we have proposed two large brownfield cities keeping the Bhogapuram Airport as a catalyst node. These include 1) Vizag Bay City (40 sq. km) and 2) Vizag 2.0 (210 sq. km). Figure 90 provides a geographical representation of these developments.

Figure 90: Geographical representation of the two brownfield cities



VER should strive to develop each of these cities by adopting the following principles:

1. **Master plan in an integrated manner:** Both these brownfield cities should be master planned to be developed in a walk to work design, with housing adjacent to retail, office spaces, multi-modal transit options, and social amenities (schools, parks, clinics) planned within a 15-minute walking radius of housing zones. The next steps are as follows:
   - Create a phased development plan for these cities and expedite zoning of these areas through an official notification
   - Acquire 10-15% of land in these brownfield cities through direct acquisition, agglomeration or pooling to kick-start the development cycle
   - Strategically identify and start acquiring land around all the transit nodes
2. **Sustainability embedded development:** The master plan for Vizag Bay City and Vizag 2.0 should incorporate the vision of developing them as modern, sustainable cities with best-in-class features such as blue/green infrastructure, underground utilities, plug-and-play facilities, central utility tunnels, automated vacuum waste systems, waste-recycling systems and centralised district cooling plants
3. **Adopt best practices from large ongoing/upcoming greenfield/brownfield developments:** KSC New Town (323 sq. km) and NAINA (225 sq. km) are examples of two large upcoming greenfield cities near Mumbai, which can serve as inspiration for these two brownfield cities in VER

Proposed interventions to achieve VER's aspiration

These proposed developments projects are detailed below:

1. **Developing Vizag Bay City as a world-class mixed-use brownfield city:**

   Vizag Bay City has been recommended to be developed as a world-class integrated mixed-use waterfront city, to cater to an aspiring urban workforce in a growing economy. The city is proposed to be strategically located along the beach corridor between the Bheemli beach in the north and Kailasagiri in the south.

   In line with global models like Miami's Bayshore Corridor (Figure 91) and Dubai's Jumeirah Beach, the aspiration is to develop 25 km of prime coastline between Kailasagiri and Bheemili beach as a vibrant mixed-use city area, comprising:

   - 2,000-2,500 additional hotel rooms
   - 70+ restaurants
   - 80-100 beach shacks and 8-10 beach clubs
   - Recreational amenities including open-air event venues, 2-3 shopping complexes, boardwalks, cycling tracks, water sports zones, spas etc.
   - 10+ tourism hotspots like Kailasagiri, Thotlakonda, 1 marina with 5-6 jetties, a

renowned adventure/theme park etc.

- Hub of high-end housing in VER, with 5,000-7,000 housing units including premium villas, high-end apartments and condominiums, spread across 10-11 million square feet master planned across the beach corridor

Note: For more details on Vizag Bay City, refer to Figure 60 in the chapter on 'Growth driver 4: Renowned tourism attraction'.

Figure 91: Case Study - Miami's mixed-use Bayshore Corridor

10,000+
Luxury residential units

11 km
from Miami airport connected via metro rail

4
Luxury marinas with 2 major jetties

5-7
Beach clubs

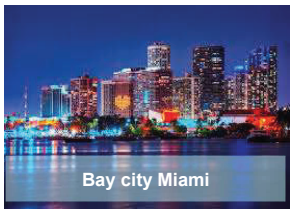
1
Sailing district

Key highlights of Miami Bayshore Drive

10km Bayshore Drive in Miami has been developed as high-end urban, mixed-use area in north & low-rise, heritage rich area in south

North Bayshore: High-end urban, mixed-use with the Baycity hosting high-end residential units

South Bayshore: Low-rise, heritage rich area with 223 historical buildings, residential units and schools



2. **Vizag 2.0 as a long-term, multi-decadal metropolis development project:** Vizag 2.0 is envisioned as a modern, mixed-use, services-led metropolis. Spanning 40-50 km in length, from Visakhapatnam Port in the south to Bhogapuram Airport in the north, and 4-5 km in breadth, Vizag 2.0 is expected to span an area of 200-250 sq. km. In addition to the Bay City, Vizag 2.0 will integrate most of the job-creating service hubs outlined earlier, including the IT and data centre hubs in Madhurawada, Kapuluppada, and Anandapuram; the Bhogapuram Aerocity; the education, skilling and innovation hub proposed near IIM Vizag; and a major entertainment complex. The care city will also be located at its periphery. While Vizag Bay City is targeted for development within the next 5-7 years (by FY32), Vizag 2.0 should be considered as a multi-decade ongoing metropolitan project till FY47

As mentioned before, the entire area should be master planned as a modern, mixed-use city that is environmentally sustainable and TOD focused, with conscious development of ALTAs and talent/affordable housing.

2. Redevelopment of 130,000 slum households by FY32

In the past, the Government of Andhra Pradesh transferred land titles for nearly all slum households situated on state government land in VER to their occupants, thereby formalising their tenure. However, slum households on GoI land did not undergo the same process. As a result, majority of slum households in VER are located on GoI land.

VER currently has approximately 130,000 slum households located on land owned by ministries such as Railways, Ports, Shipping and Waterways, and Civil Aviation.

Since these households are on GoI land, a new slum rehabilitation policy aligned with the GoI's 'Housing for All' scheme must be created. Wherever feasible, these households should be rehabilitated in situ. Their redevelopment can be made viable through cross-subsidisation and developer incentives such as additional Floor Area Ratio (FAR) and Transferable Development Rights (TDR).

3. Cluster redevelopment of 6-8 dense areas by FY32

Urban areas often face a challenge where new development sprawls to the city's periphery, leaving older, often dilapidated structures built on outdated standards, occupying prime real estate in centrally located areas.

New York faced a similar challenge and overcame it through targeted redevelopment in several key regions, including:

- **Meatpacking district:** The district was converted from its original use as a base for over 200 slaughterhouses and meat-packing plants into a bustling, after-hours economic centre. The area is now a vibrant destination with a dense cluster of eateries, bars, and nightclubs
- **Hudson Yards:** Previously a rail yard, the location was master planned and redeveloped into a 28 acres mixed-use hub. This modern development includes 26 million square feet of office space, 13,500 new housing units, several hotels, and significant open spaces

Several such examples of ongoing and successful cluster redevelopment also exist in India:

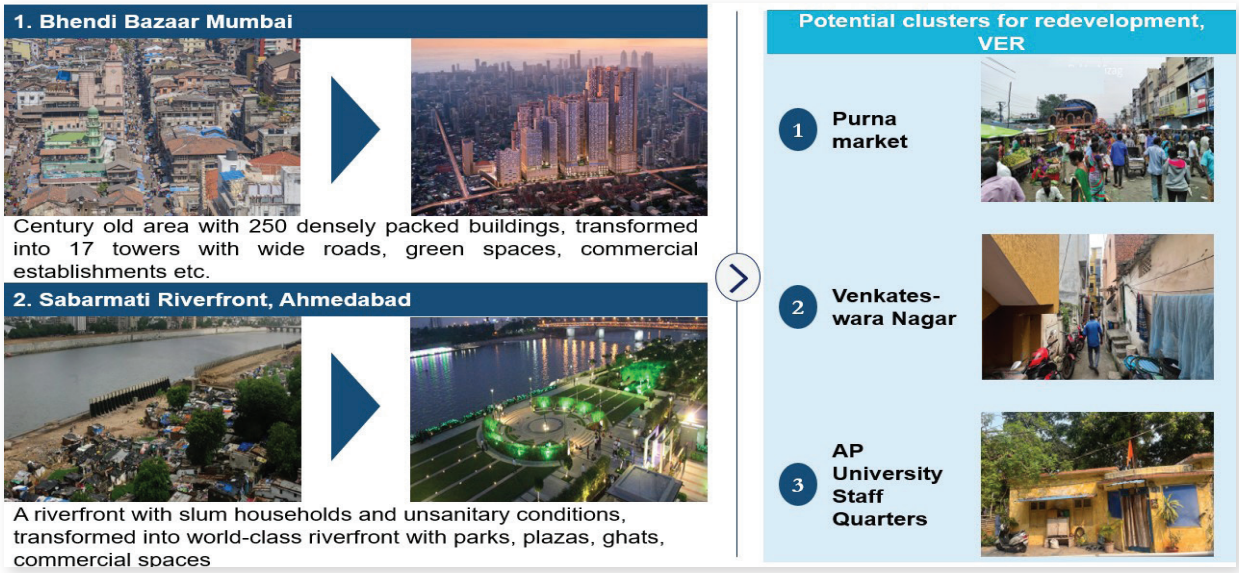
- **Bhendi Bazaar, Mumbai:** Previously, a historic market and residential area in Mumbai known for its dense population, narrow streets and centuries-old, dilapidated buildings, is undergoing cluster redevelopment, converting 250 old buildings into 17 towers, increasing its physical footprint from 1.5 to 4 million square feet, while also creating space for wide streets, tree-lined footpaths, parks, central plaza etc.
- **Sabarmati riverfront, Ahmedabad:** Previously characterised by informal settlements and unhygienic conditions, the area has transformed into a well-planned riverfront with

a public promenade, parks, plazas, ghats and commercial spaces

Similarly, to revitalise the city's core, six to eight old, densely populated neighbourhoods in Visakhapatnam should be identified and redeveloped under a cluster redevelopment approach. This could include the government agency staff quarters of Andhra University and GVMC, as well as prominent locations like Purna Market and Venkateswara Nagar.

Using this approach, these areas can be redeveloped in line with best-in-class standards with open spaces, citizen amenities, and mixed-use development by providing buildings with additional Floor Area Ratio (FAR) at a premium and by master planning large areas in an integrated manner.

Figure 92: Cluster redevelopment case studies and recommendations for VER



4. Transit Oriented Development (TOD) near 10-12 stations

VER is expected to see the development of 90-100 transit nodes, including 55-60 metro stations and 35-40 bus stations. These hubs present an opportunity to build compact, high-density, mixed-use communities that improve ease of living and reduce travel times. To unlock this potential, 10-12 strategic transit hubs, (including 4-5 in municipal corporation areas, 3-4 around industrial cities, and 3-4 around service hubs) should be identified across the region.

An area of 500-1,000 metres around each node should be densified and master planned to integrate residential units, commercial complexes, retail, hospitality, and community infrastructure, including modern transit stations.

TODs should be supported through, regulatory incentives such as increased FAR, relaxed setback requirements, and flexible parking norms. Of the total 650,000-750,000 housing units to be developed in VER, 75,000-80,000 units and 10 million square feet of office space can be developed around major transit hubs.

Principles for favourable development economics

To ensure favourable development economics for these hubs, the following principles should be adopted:

- All government land in VER should be agglomerated with VMRDA or other suitable agency for development and monetisation (similar to what Maharashtra is doing), creating an aggregate land bank of 10,000-20,000 acres
- Entire area master planning for these cities should be done in a mixed-use manner that includes job creation, ALTAs including schools and hospitals, retail, recreation and housing
    - 25-30% land in industrial areas should be used for mixed-use housing, retail, hotels, and recreation with a global FAR of 2-4. This will also pay for the infrastructure development and further land acquisition
    - 30-40% land in service hubs should be used for housing, recreation, retail, hotels and open spaces with a global FAR of 2-4
- Base infrastructure (water, sewage, stormwater drainage) and connectivity (metro, rail, or road) should be planned and implemented up-front
- Any planned city should be given a global FAR of at least 2 to be able to optimise and build both low-density (e.g. green spaces, schools) and high-density (housing, commercial, retail) zones
- To recover the infrastructure costs (road, metro, sewage, water), an infrastructure development premium should be charged on each sq. ft of the base FAR, as well as additional charges on incremental FAR granted in select regions (such as TOD, Bay City and redevelopment projects)
- The charges from the infrastructure premium and the additional charges for incremental FAR, could be split evenly between the Development Authority and the urban local body.
- 1% additional stamp duty cess should flow directly to the Development Authority to pay for the infrastructure creation in the region
- TOD land should be pooled, acquired or planned before the transportation project starts
- The concept of Transferable Development Rights (TDR) should be introduced and a market should be created for the same, similar to cities like Mumbai, wherein unused FAR can be bought and sold between developers
- To make slum redevelopment projects financially viable, each slum household should be charged a specific amount per house. The Central government's 'Housing for all' scheme and state-specific schemes should be leveraged to subsidise the balance
- Development should be further incentivised through additional FAR. Remaining vacant

land post rehabilitation should be either auctioned or further developed and sold to make the whole project financially viable

Land, investments and policy architecture

1. Land and geographical landscape

3,500-4,000 acres of land parcels across VER will be required for creating 650,000-750,000 housing units and urban amenities. This land requirement has already been accounted for within the 15 planned hubs, where 20-30% of the land should be reserved for housing and mixed-use development.

2. Investments

The private sector will account for around 90% ($10-11 billion) of the $11-12 billion investment required to undertake planned urbanisation and housing development in VER. The state government agencies will have to invest 5% ($0.5-0.6 billion) for NPV-positive investments in land and infrastructure development.

Subsidies for developing housing for lower-income groups (LIG) through the PMAY scheme will account for the remaining 5% ($0.5 billion). This will be shared between the central government ($0.25 billion), state government ($0.13 billion) and state housing agencies ($0.13 billion). Currently, the central and state government, provide a subsidy of ₹150,000 -160,000 per house.

3. Policy architecture

Two new policies will have to be developed in order to enable and catalyse this urbanisation:

- A dedicated land value capture/land monetisation policy to maximise economic gains from increased land value
- Slum rehabilitation and cluster redevelopment policy

Growth Driver 7

Lighthouse of sustainability and best-in-class infrastructure

Context and aspiration for VER

To transform into a $125-135 billion economy, VER must lead by example, emerging as a lighthouse for sustainable, connected, and future-ready infrastructure. An infrastructure pipeline has already been set in motion, with $4-5 billion allocated towards roads, railways and water projects. Over the next 5-7 years, VER will require additional investments of $9-11 billion in rail, road, metro, water and circularity infrastructure and $1.5-2 billion in transmission and distribution infrastructure in the region.

Together, these efforts can unlock $4-6 billion in incremental GVA and generate 300,000-350,000 new jobs (mainly construction), while laying down the foundation ecosystem required for VER to achieve its FY32 economic aspirations.

Proposed interventions to achieve VER's aspiration

1. Connectivity Infrastructure

By facilitating 30 major connectivity interventions (including 12 rail, 17 road, and 1 integrated metro project), VER can establish excellent connectivity between its key economic zones (12-15 manufacturing nodes, 6 ports, 6 services hubs, 12 key tourism hubs and 17 agricultural locations) across VER by FY32.

1.1. Railways: Complete 5 ongoing projects by 2027-28 and 7 new projects by 2032 (additional investments of $3.5-4 billion)

Currently, VER encompasses rail lines under the jurisdiction of both the 'East Coast Railway' and 'South Central Railway' zones of the Indian Railways. The Howrah-Chennai double line forms the spine of VER's rail network and is supported by important branches such as the Vizianagaram-Titlagarh-Raipur/Sambalpur double line and the Kottavalasa-Jagdalpur-Kirandul single line. Furthermore, the Visakhapatnam Inset serves as the fulcrum for all inbound and outbound cargo movement across VER.

VER's ports are currently underutilised, operating at 55-65% compared to the industry best-in-class standard of 75-80%. This underperformance is primarily driven by two factors: limited local cargo generation and congestion on the rail network connecting VER to the hinterland. Specifically, VER's railway line capacity utilisation of 95-120% far exceeds the optimal utilisation of about 80% required to absorb and recover from unforeseen congestion.

Furthermore, rail transport accounts for 25-30% of VER's multi-modal freight mix. This is significantly lower than countries such as the USA and Canada where rail contributes 40-50% to overall freight evacuation. Additionally, with India aspiring to increase the share of rail in the freight mix to 40-50% by 2030, significant investments will be required to bolster the railways' infrastructure in VER.[124]

In line with growth envisioned as part of this Economic Master Plan, VER is poised to witness a sizeable increase in its cargo handled, including:

- **Manufacturing output:** The region's total manufacturing output is projected to increase fivefold by FY32
- **Port Cargo:** VER is aspiring to increase its port throughput from 130-140 MMTPA currently to nearly 350 MMTPA by FY32
- **Rail Cargo:** Volume of cargo destined to/ originating from the region is projected to triple, rising from an estimated 60-70 MMTPA currently to 170-200 MMTPA by FY32

Aspiration for railways in VER

To support the anticipated increase in output, VER will need to bolster its rail infrastructure by meeting the following essential aspirations:

1. **Reducing current and future congestion and augmenting last mile capacity:** With most lines of the region at 95-120% utilisation, reducing line utilisation to 80% by completing 3rd lining and last-mile enhancement projects will be fundamental to ensure a safe, reliable and efficient rail connectivity network[125]
2. **Enhancing hinterland connectivity to key nodes and inter-state junctions:**
   - With 40-50% of AP's and 65-75% of VER's cargo originating from and destined to Odisha and Chhattisgarh, ensuring hinterland connectivity towards key nodes such as Kirandul-Bailadila and Raipur in Chhattisgarh and Titlagarh, Sambalpur, Bhadrak and Haridaspur in Odisha will be essential
   - Additionally, extended connectivity to lines originating from major inter-state junctions, such as Kharagpur and Vijayawada, will be critical towards integrating the region with the Delhi-Kolkata-Chennai-Mumbai rail corridor and the proposed national network of freight corridors[126]
3. **Creating additional rail capacity to meet future demand:** 4th lining and creation of dedicated freight lines will be required to accommodate the projected tripling of rail cargo to 170-200 MMTPA by FY32 and align with the national goal of doubling the rail coefficient to 40-50% by 2030

Proposed interventions to achieve VER's aspiration

While ongoing projects will enable capacity augmentation, VER will need to significantly invest in enhancing rail connectivity to align with the aspirations set out in this Economic Master Plan. To enable excellent railway infrastructure, completion of 5 ongoing railway projects and 7 new railway projects[127] will be critical:

- **5 ongoing railway projects:** Complete 5 ongoing rail projects by 2027-28 (already budgeted investments of $1-1.2 billion) to ease congestion and enhance last-mile rail connectivity across VER:

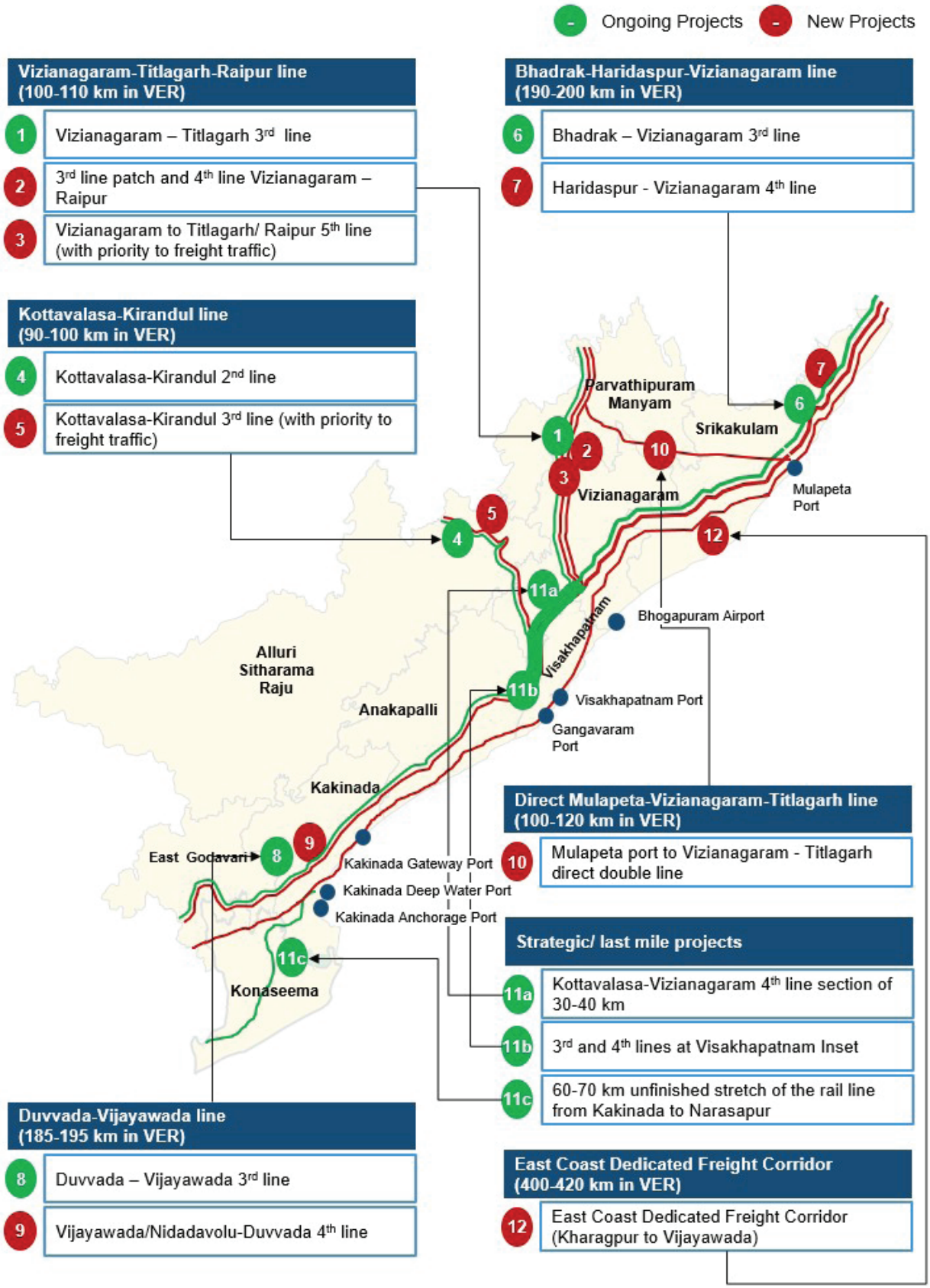
1. **Bhadrak-Vizianagaram 3rd line:** This double line section is part of the Howrah-Chennai main line and spans 510-520 km, with 190-200 km passing through VER. While this section is already a double line, its 100-110% utilisation rate makes completing the 3rd line critical for reducing congestion
2. **Vizianagaram-Titlagarh 3rd line:** This double line spans 300-310 km towards Odisha and Chhattisgarh, with 100-110 km passing through VER. As a key route for hinterland connectivity, its current 100-110% utilisation makes the timely completion of the 3rd line fundamental to reduce congestion
3. **Duvvada-Vijayawada 3rd line:** This double-line section of the Howrah-Chennai main line spans 330-340 km towards Vijayawada, with 185-195 km passing through VER. However, this line is already at 110-120% utilisation and requires completion of 3rd line to alleviate severe congestion
4. **Kottavalasa-Kirandul 2nd line:** This critical hinterland route which connects VER's steel ecosystem to the Kirandul-Bailadila mineral belt is currently a single-line. Completing the ongoing work for doubling of the Kottavalasa-Kirandul line will be essential to de-bottleneck the supply of iron ore to existing steel plants in VER
5. **Strategic projects at major points of convergence:** These projects are focused towards important sections of the Visakhapatnam Inset, the Kottavalasa-Vizianagaram stretch and the Kakinada-Narasapur stretch:
   - Kottavalasa-Vizianagaram 4th line section of 30-40 km
   - Last mile capacity augmentation, including 3rd and 4th lines at Gopalapatnam-Simhachalam-Duvvada junctions at the Visakhapatnam Inset
   - Completing the 60-70 km unfinished stretch of the rail line from Kakinada to Narasapur to create connectivity for the Dr. B.R. Ambedkar Konaseema district with the Howrah-Chennai main line

- **7 new rail projects:** VER should complete seven new rail projects by 2032, requiring an estimated $3.5-4 billion in additional investment to meet the increase in rail cargo anticipated in this master plan. These lines are:
  1. **3rd line patch and 4th line from Vizianagaram-Raipur:** While 3rd lining is already underway along this route, it will be insufficient to meet future cargo traffic generated in line with VER's G-hub aspirations. Therefore, this 4th line of 520-540 km, with 100-110 km passing through VER, will be essential to enhance hinterland connectivity towards the west and north-west, enabling connectivity to important junctions such as Titlagarh in Odisha and Raipur in Chhattisgarh. This line will also provide connectivity to bifurcating lines connecting important industrial belts such as Sambalpur and Jharsuguda in Odisha
  2. **Haridaspur-Vizianagaram 4th line:** While the 3rd line is currently being developed along this route, a 4th line will be necessary to meet future cargo traffic demands by FY32 and bolster interstate rail freight evacuation towards the north. This new 4th

line of 460-470 km, of which 190-200 km will pass through VER, will be necessary to enhance connectivity along the Howrah-Chennai main line. It enables hinterland connectivity by extending northwards towards Odisha and further connects into major interstate freight and passenger junctions such as Kharagpur and Howrah in West Bengal

3. **Vijayawada/Nidadavolu-Duvvada 4th line:** This line of 330-340 km between Visakhapatnam and Vijayawada, with 185-195 km passing through VER, connects the region to its southern hinterland (Telangana, Karnataka and Tamil Nadu). Vijayawada junction is an important point of convergence for interstate passengers and cargo travelling to/ from Telangana, Karnataka and Tamil Nadu. Therefore, enhancing line capacity till the 4th line level towards Vijayawada junction will be integral to meet the FY32 cargo requirements
4. **Vizianagaram to Titlagarh/ Raipur 5th line with priority to freight traffic:** In addition to 3rd and 4th lining, this additional line can provide prioritised freight evacuation on this route by connecting VER to key mineral and industrial corridors in Chhattisgarh, Odisha, and beyond
5. **Kottavalasa-Kirandul 3rd line:** In addition to the ongoing doubling on this route, expanding it to the 3rd line level will play an important role in supporting VER's future vision of creating a 25 MMTPA steel hub in the region by FY32
6. **Direct double line from Mulapeta port to the Vizianagaram-Titlagarh line:** Currently, sidings from the new Mulapeta port converge into the Howrah-Chennai main line, with no direct connectivity towards the western and northwestern hinterlands. Therefore, a new 100-120 km double line connecting directly to the Vizianagaram-Titlagarh line will enhance hinterland connectivity and support the Mulapeta port
7. **East Coast Dedicated Freight Corridor (Kharagpur to Vijayawada):** New dedicated 1,100-1,200-km freight corridor, with 400-420 km passing through VER can ease the over-burdened Howrah-Chennai main line (used for both passengers and freight) by creating an alternate, dedicated and faster route for freight passing through AP and VER. The DPR of this project is currently under examination with the Ministry of Railways and its timely approval will be critical towards the completion of this project[128]

Figure 93: Ongoing and new railway projects



1.2. Roads: Complete 8 ongoing projects by 2027-28 and 9 new projects by 2032 (additional investments of $1.7-2 billion)

Currently, the Kolkata-Chennai NH-16 forms the major spine of the road network in VER, supported by other national and state highways including NH-26, NH-326A, and SH-39. While NH-16 has 6 lane sections in critical junctures proximate to Visakhapatnam, it is predominantly a 4-lane highway in VER.[129]

Most of VER's port evacuation routes and industrial hubs overlap, clustered around highly congested regions such as Gajuwaka and Lankelapalem in Visakhapatnam and Vakalapudi in Kakinada. Additionally, most of the port evacuation routes meet city roads and lead to a convergence of passenger vehicles, public transport and freight carriers.[130]

The 8 road projects that are already underway include essential port connectivity projects such as the 4-laning of NH-516F in Kakinada and the 6-laning of NH-516C in Visakhapatnam. It also includes hinterland connectivity projects such as the 6-lane NH-130CD from Raipur to Visakhapatnam and the NH-516E spanning the ASR district. It is imperative to complete these projects by 2027-28. Investments of $1.5-2 billion have already been budgeted for these projects.

In addition to the ongoing projects, VER will need to complete 9 new projects by 2032 to achieve excellent road connectivity. These projects aim to enhance hinterland connectivity while easing the burden on NH-16 with roads such as the new 4-lane Kakinada-Mulapeta bypass connecting to NH-130CD and NH-26, which further extend toward industrial corridors in Chhattisgarh and Odisha.

Similarly, with the majority of VER's manufacturing clustered between NH-16 and the coastline, roads such as the new 4-lane Kakinada-Visakhapatnam coastal road and 4-lane Mulapeta-Visakhapatnam coastal road will enable direct connectivity between 6 ports and 12-15 manufacturing nodes. The new Kakinada-Mulapeta bypass and coastal roads can potentially redirect freight traffic (hinterland and local) away from NH-16, enabling it to better serve both local and interstate passenger traffic.

Meanwhile, projects such as the new Vizag beach corridor and the 4-lane elevated road corridor (proximate to the Visakhapatnam Metro) will help ease traffic towards the Bhogapuram airport and enhance connectivity between key areas such as the existing industrial areas, IT hubs, city centre and the proposed Vizag Bay City.

Additionally, other new road projects recommended in this Economic Master Plan such as Gangavaram port to Tungalam; 4-lane beach road from Gangavaram port to Atchutapuram and NH-16; Rambilli-Bhogapuram semi-ring road via NH-16; and 6-laning of Sheelanagar-Sabbavaram section of NH-516C will be critical to augment last mile connectivity, supporting the ports and the manufacturing nodes across the Visakhapatnam and Anakapalli districts.

Proposed interventions to achieve VER's aspiration

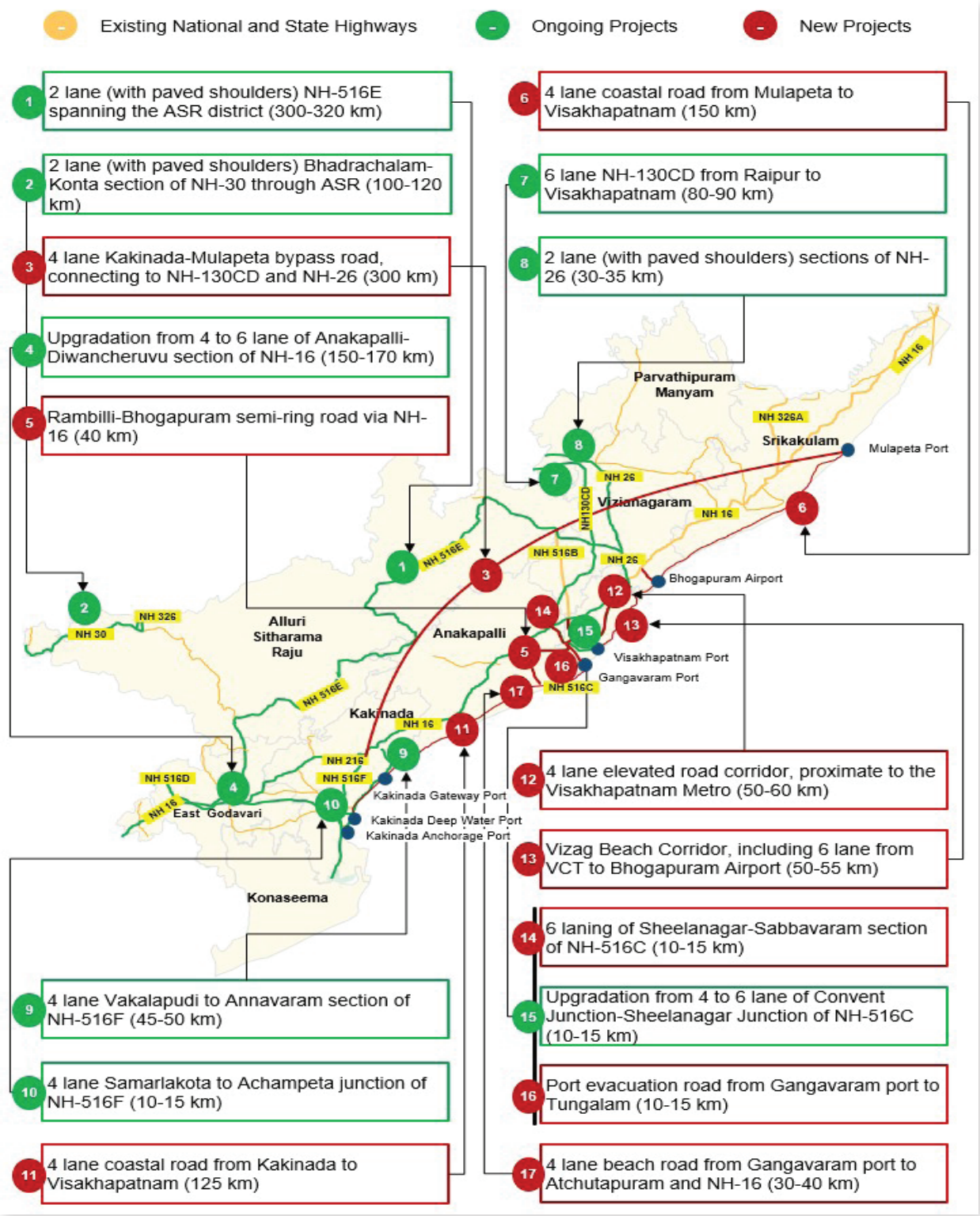
To achieve VER's road connectivity vision, the following interventions will be essential:

- **Complete 8 ongoing road projects:** To improve road connectivity, 8 ongoing projects (budgeted investments of $1.5-2 billion) will have to be completed by 2027-28:
  1. **6-lane NH-130CD from Raipur to Visakhapatnam:** This 450-470 km 6-lane road from Visakhapatnam to Raipur, with 80-90 km passing through VER, will significantly enhance hinterland connectivity towards Odisha and Chhattisgarh
  2. **2-lane (with paved shoulders) sections of NH-26:** This 30-35 km road upgradation will bolster connectivity from Visakhapatnam towards the western and northwestern part of VER and provides critical hinterland connectivity to Odisha
  3. **2-lane (with paved shoulders) NH-516E spanning the ASR district:** This 300-320 km road will connect critical junctures across the ASR district, (such as Lambasingi, Paderu and Araku), with NH-16 in the East Godavari, Vizianagaram and Visakhapatnam districts
  4. **2-lane (with paved shoulders) Bhadrachalam-Konta section of NH-30 passing through ASR:** This 100-120 km road section on the outskirts of the ASR district will be a part of an extensive highway extending from Uttarakhand to Andhra Pradesh
  5. **Upgradation from 4 to 6-lane of Anakapalli-Diwancheruvu section of NH-16:** This 150-170 km road upgradation project will enhance the 4-lane section of NH-16 located towards the south of Visakhapatnam to 6-lane capacity
  6. **Upgradation from 4 to 6-lane of Convent Junction-Sheelanagar Junction of NH-516C:** This 10-15 km road upgradation will be a major port evacuation project to decongest traffic and ease evacuation from Visakhapatnam Port
  7. **4-lane Vakalapudi to Annavaram section of NH-516F:** This 45-50-km 4-lane road will be a critical port evacuation road connecting the ports in Kakinada to NH-16 towards the north
  8. **4-lane Samarlakota to Achampeta junction of NH-516F:** This 10-15-km road will be a critical port connectivity road originating from the ports in Kakinada and connecting to feeder roads extending southward towards NH-16 at Rajamahendravaram in East Godavari
- **Complete 9 new road projects:** This master plan recommends completion of 9 new road projects requiring additional investments of $1.7-2 billion to improve connectivity to the hinterlands, key economic hubs and the 6 ports by 2032:
  1. **4-lane Kakinada-Mulapeta bypass road, connecting to NH-130CD and NH-26:** This new 300 km bypass road from Kakinada to Mulapeta, will connect to NH-130CD and NH-26, and create additional connectivity towards industrial corridors in Odisha and Chhattisgarh. With NH-16 passing through major urban agglomerations and district headquarters, this new road will enhance hinterland connectivity by creating

an alternate route for traffic headed from/to the ports in Kakinada and Mulapeta. Additionally, it will allow traffic from Chhattisgarh and Odisha passing through VER to bypass a major section of NH-16, which is likely to serve an increase in traffic from the development of proximate urban agglomerations

2. **4-lane coastal road from Mulapeta to Visakhapatnam:** This new 150 km coastal road will create direct port-to-port connectivity for freight evacuation between 3 ports (Visakhapatnam, Gangavaram and Mulapeta) and connect manufacturing nodes planned near Visakhapatnam, Vizianagaram and Srikakulam (Mulapeta)
3. **4-lane coastal road from Kakinada to Visakhapatnam:** This new 125 km coastal road will enable direct port-to-port connectivity for freight evacuation between 5 ports, including the 3 Kakinada ports, Gangavaram port and Visakhapatnam port. It will also connect the manufacturing nodes planned in Kakinada, Nakkapalli, Anakapalli and Visakhapatnam
4. **Vizag Beach Corridor, including 6-lane from Visakhapatnam container terminal to Bhogapuram airport:** This 50-55 km 6-lane road will extend all the way from Visakhapatnam port to Bhogapuram Airport and is expected to be an integral tourism hotspot, providing vital connectivity to the proposed Vizag Bay City and various beaches (such as RK Beach, Rushikonda, Bheemili)
5. **4-lane elevated road corridor, proximate to the Visakhapatnam Metro:** VER should create a 50-60 km elevated road corridor, running proximate to the Visakhapatnam Metro, extending all the way to the Bhogapuram airport. This elevated corridor will be essential for decongesting traffic in Visakhapatnam and creating seamless connectivity between the city centre and the Bhogapuram airport
6. **Rambilli-Bhogapuram semi-ring road via NH-16:** This 40 km road extension will connect to NH-16, creating direct connectivity from the southernmost industrial tip of Visakhapatnam-Anakapalli to the Bhogapuram Airport
7. **4-lane beach road from Gangavaram port to Atchutapuram and NH-16:** This 30-40 km road will be an integral port evacuation road that will bypass highly congested areas and provide direct evacuation from Gangavaram Port to the industrial areas near Atchutapuram and NH-16
8. **Port evacuation road from Gangavaram Port to Tungalam:** This 10-15 km road will be an important last mile road that will enhance evacuation from Gangavaram port to proximate industrial areas and other feeder roads that extend to NH-16
9. **6-laning of Sheelanagar-Sabbavaram section of NH-516C:** This 10-15 km road upgradation will be a critical port evacuation road that will decongest and connect Gangavaram and Visakhapatnam port to NH-16

Figure 94: Ongoing and new road projects



1.3. Metro: Complete both phase 1 and 2 of the Visakhapatnam Metro by 2028-30 (total investment of $2-2.5 billion)

A strong metro-based transit system is the hallmark of many leading metropolises. For instance, Indian cities such as Delhi (375-400 km) and Mumbai (330-340 km), and

international hubs such as Tokyo (350-360 km), leverage expansive metro networks to drive economic transformation and enhance connectivity.

Visakhapatnam has currently developed a phased plan to establish a modern metro system, positioning the city for future growth:

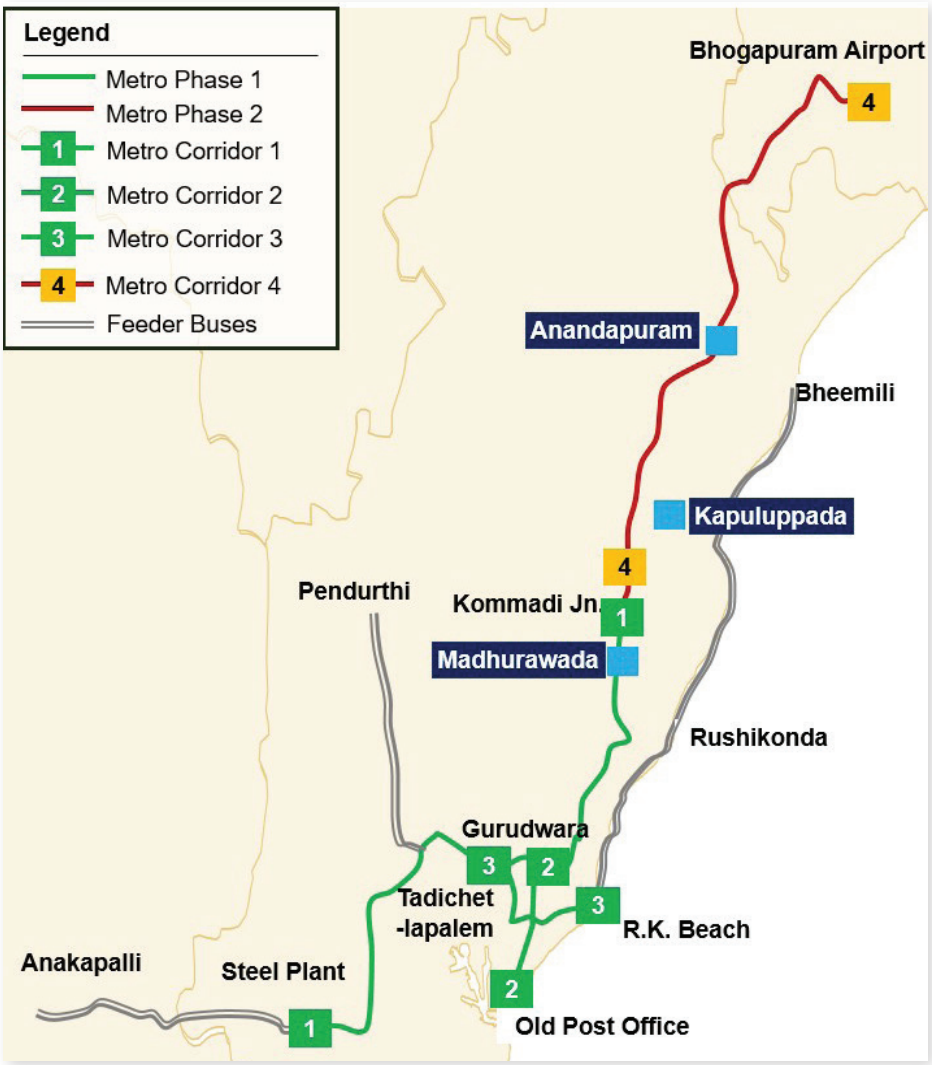
- **Phase 1** comprises three metro corridors (lines) and spans 47 km. It is likely to be completed by 2028-29:
  - **Corridor I (30 km):** Will connect the industrial area near the steel plant in the south to the Kommadi Junction near the city centre.
  - **Corridor II (5 km):** Will traverse the city in a north-south direction between key landmarks such as the gurudwara and the old post office.
  - **Corridor III (7 km):** Will pass through the city in an east-west direction, connecting regions between Tadichetlapalem and RK beach.
- **Phase 2** comprises one metro corridor of 30 km and is likely to be completed by 2030-32:
  - **Corridor IV (30 km):** Will extend northward, connecting Kommadi junction near the city centre to the Bhogapuram airport

Proposed interventions to achieve VER's aspiration

To ensure robust metro connectivity in Visakhapatnam, the following interventions will be necessary:

1. **Integrate and complete phase 1 and 2 of the 77 km planned Visakhapatnam Metro by 2028-30:** Since phase 1 of the metro does not connect to the IT hubs at Kapuluppada and Anandapuram as well as the Bhogapuram Airport, it is recommended that the 30 km Phase 2 should be combined and completed with phase 1 by 2028-30 to ensure seamless connectivity between the key economic hubs (such as the industrial area in the south, the city centre, and the IT and services hubs in the north) and transit nodes (such as Bhogapuram airport and the Visakhapatnam railway station)
2. **Develop a 50-60 km elevated road corridor:** Create 4-lane elevated road connectivity, running proximate to the Visakhapatnam Metro, all the way from the city centre to the Bhogapuram Airport (as mentioned in the previous section on road infrastructure)
3. **Create 50-60 km of feeder bus corridors:** To ensure last mile connectivity and extend the metro's reach into peripheral areas, the development of a 50-60 km dedicated feeder bus corridor network by 2030, is suggested. This network must integrate popular hubs such as Anakapalli, Pendurthi, Rushikonda, and Bheemli directly with metro stations. These buses should ideally be electric
4. **Transit-Oriented Development (TOD) of metro stations:** VER's planned 55-60 metro stations present significant potential for TOD by enabling development of integrated commercial, residential, and retail infrastructure (as detailed in the chapter on Growth Driver 6)

Figure 95: Visakhapatnam Metro Corridor



2. Sustainability Infrastructure

VER will need to develop excellent sustainability infrastructure, including 1,800-2,000 MLD of additional water supply; 1,700-1,900 MLD of additional sewage and wastewater treatment; circularity infrastructure such as 2-3 new CBG plants and 1 new waste-to-energy plant; 4000 new EV/ CNG buses and a climate adaptability blueprint.

2.1. Water and sewage: 1,800-2,000 MLD water and 1,700-1,900 MLD sewage treatment capacity addition by FY32 (additional investments of $0.8-1 billion)

Water

The VER region currently consumes an estimated 7,200-7,500 MLD of water across sources, with usage split between domestic, industrial, and power generation (1,800-2,000 MLD) and agricultural uses (5,400-5,500 MLD).

Currently, the region has a per capita water availability of 90-100 LPCD in urban areas and 50-60 LPCD in rural areas. However, to create excellent water availability (in line with cities such as London and Tokyo) and match India's per capita water availability aspirations, VER should aspire to increase its per capita water availability to 150 LPCD in urban areas and 70 LPCD in rural areas by FY32.[131] Additionally, growth in sectors such as steel, petrochemicals, pharmaceuticals, other manufacturing and data centres will further drive an increase in water demand of 800-1,000 MLD. Pursuant to VER's quality of living and manufacturing aspirations, the region will require an additional 1,800-2,000 MLD of water by FY32.

Proposed interventions to achieve VER's aspiration

1. **Fast-tracking and completing ongoing projects to ensure 1,800-2,000 MLD of incremental water availability by FY32:** VER is on track to be a bulk water sufficient region on the back of ongoing projects such as the Polavaram Left Main Canal, Yeleru Pipeline Project and Uttarandhra Sujala Sravanthi. Together, these projects can sufficiently meet VER's additional water demand of 1,800-2,000 MLD and total water demand of 9,000-9,500 MLD by FY32. Timely completion of these projects will be critical to ensure future water adequacy in the region
2. **Creating 6,000-7,000 km of pipeline network:** VER will need to expand its distribution pipeline network by adding 6,000-7,000 km of new pipelines. This will connect end-users to bulk reservoirs and storage units of urban local bodies, ensuring strong infrastructure to enable last-mile water supply. To build the additional pipeline network, VER will require investments of around $200-300 million. Gaps in the current ecosystem that mandate this investment include:
    - **Distance from reservoirs:** Although some of VER's reservoirs such as Mudasarlova, Meghadri Gedda and Gambheeram are located close to urban agglomerations, others such as Yeleru and Raiwada are located 50-60 km outside major cities such as Kakinada and Visakhapatnam respectively, thus requiring enhanced last mile connectivity to storage tanks of urban local bodies
    - **Serving high-density regions:** Last-mile water distribution networks will be crucial for ensuring a reliable water supply in densely populated areas such as Gajuwaka and the Visakhapatnam city centre
    - **Upgrading legacy infrastructure:** Storage units such as the Aratlakatta tank and Maharshi Sambamurthy tank in Kakinada are plagued with ageing infrastructure and require enhancements in the evacuation network to maintain water supply to overhead tanks in the city

Sewage and wastewater

Presently, VER has a sewage and wastewater treatment capacity of 500–600 MLD, with only 10–20% treated at the tertiary level.

To meet the current shortfall and future demand by FY32, VER should create an additional 1,700-1,900 MLD of sewage and wastewater capacity targeting 100% secondary and 40-50% tertiary treatment.

Similar to global benchmarks such as Singapore, which meets nearly 40% of its water demand from recycled wastewater, VER can aspire to meet 30-40% of its FY32 industrial and domestic water demand from recycled water. This water can be used for a wide variety of purposes such as consumption in industrial processes, urban landscaping, construction, dust control, application in cooling towers and toilet flushing.

Proposed interventions to achieve VER's aspiration

To achieve these goals, VER must focus on the following interventions:

1. **Create 1,700-1,900 MLD of additional sewage and wastewater treatment capacity with 40-50% treated at a tertiary level:** VER will need to create additional treatment capacity, with 100% treated at the secondary level and 40–50% treated at the tertiary level to move closer to zero discharge of polluted or untreated wastewater. While 100% secondary treatment will help reduce BOD levels of treated water to less than 30 mg/l, tertiary treatment will be required to reduce BOD levels to less than 10 mg/l and make the treated water fit for reuse. Treating 1,000-1,200 MLD of the sewage and wastewater treated at tertiary level, will result in the creation of 700-1000 MLD of recycled water, allowing VER to meet 30-40% of its FY32 industrial and domestic water demand from recycled water
2. **Develop 4,000-5,000 km of additional sewage network:** To support the expansion in treatment capacity, the region will need to develop an additional 4,000–5,000 km of sewage network comprising double-walled corrugated pipes, UPVC pipes, canals, and other systems to ensure seamless connectivity between generation points and treatment plants
3. **Explore the creation of a recycled wastewater grid:** To facilitate VER's recycled water aspirations, the region should explore the creation of a recycled wastewater collection and distribution grid, to carry sewage and wastewater from generation sources to sewage treatment plants, modelled on Singapore's NEWater system. VER's system can include centralized tertiary sewage treatment plants of 50-100 MLD capacity spread across districts, as well as captive industrial effluent treatment plants with specialized capacities tailor-made for industrial clusters. The grid network can enable distribution of recycled water by delivering it to local consumers for industrial and municipal re-use

2.2. Circularity infrastructure: 6,000-8,000 TPD of additional waste processing capacity by FY32 (additional investment of $0.8-1 billion)

Currently, VER produces an estimated 7,000-8,000 TPD of waste, including solid waste, plastic waste, construction and demolition waste, e-waste, automotive scrap and other

waste. However, VER's waste processing capacity is limited to only 25-30% of the total waste generated. In line with the state's aspirations, VER should aspire to achieve the following KPIs by FY32:

- Processing 100% of its MSW & MSW equivalent waste from urban and rural areas
- Process at least 50-60% of its C&D waste, drawing inspiration from best-in-class benchmark Norway which processes 70-80% of its C&D waste

Proposed interventions to achieve VER's aspiration

To meet current shortfall and manage waste volumes projected by FY32, VER will need an additional 6,000-8,000 TPD of waste processing capacity, including 100% MSW treatment and 50-60% C&D waste treatment. Therefore, the following interventions will be necessary:

1. **Establishing 2-3 greenfield CBG plants:** This includes one at-scale plant of 500-550 TPD capacity and 1-2 smaller plants of 300-350 TPD capacity each, processing MSW & MSW equivalent biodegradable waste from urban and rural areas, potentially located across Kakinada, East Godavari and Anakapalli. VER can look to Indore for inspiration, where a 550 TPD CBG plant produces 17,000-20,000 kg of Bio-CNG daily. The Indore CBG plant has a variety of offtake agreements with industrial and commercial users and supplies gas to the Indore Municipal Corporation for use in the city's bus fleet. The Bio-CNG is also distributed to more than 15,000 households and has contributed to the abatement of around 70,000 tCO2e emissions annually
2. **Setting up a new Waste-to-Energy (WTE) plant:** Establish a new WTE plant with a capacity of 900-1,000 TPD for processing MSW and MSW equivalent non-biodegradable/dry waste from urban and rural areas. This new unit can generate around 10-20 MW of power, in addition to the existing 1,000-1,200 TPD WTE plant at Visakhapatnam, which already produces around 15 MW
3. **Creating a 100-200 acres circularity park:** Establish a park with multiple units processing 600-800 TPD of plastic waste, 4,000-4,500 TPD of construction & demolition waste, 100-300 TPD of e-waste and 50-150 TPD of automotive scrap amongst others. Potential locations for this circularity park include Visakhapatnam and Anakapalli
4. **Targeting 100% waste segregation:** Mandate and ensure that 100% of all waste is segregated at its collection source throughout the region by FY32

2.3. Sustainable public bus transport: 4,000 new Electric/ CNG buses by FY32 (additional investments of $0.4-0.6 billion)

The combined Phase 1 and Phase 2 of the Vizag metro, along with the new road projects proposed in this Economic Master Plan, will connect Visakhapatnam's nucleus to major industrial and service hubs, the Bhogapuram airport, and the Visakhapatnam and Gangavaram ports. However, since most industries are planned towards the south of Visakhapatnam, and the majority of services and tourism hubs are to the north, it will

be essential to establish a robust public bus transport system offering both intracity and intercity feeder and last-mile connectivity services.

Specifically, strengthening intercity bus services to district headquarters and populous urban agglomerations such as Anakapalli, Nakkapalli, Kakinada, Paderu, Araku, Vizianagaram, and Srikakulam will be important for passengers travelling to and from the 15 urban hubs planned in the region.

Moreover, with significant congestion in existing industrial areas such as Atchutapuram and Gajuwaka, feeder and last-mile bus services will be critical to link these peripheral industrial zones with the Visakhapatnam Metro. Additionally, dedicated public bus services should be created along popularly frequented routes such as Anakapalli to Visakhapatnam Steel Plant and RK Beach to Bheemili. These interventions will ease traffic pressure and enhance connectivity between peripheral regions and the metro system.

At the moment, VER has fewer than 500 municipal public transport buses with less than 5% fleet electrification. Furthermore, the region has no dedicated body for planning bus routes and schedules. To connect some of the aforesaid regions with sustainable public transport and achieve per capita public bus availability of 400-500 buses per million population in key regions (similar to leading benchmarks such as Bengaluru, Delhi and Chennai), VER will need to add over 4,000 new electric/CNG buses by FY32. These buses can be operated on a PPP Gross Cost Contract (GCC) model, by a new bus transit authority (like DIMTS in Delhi) to facilitate route optimisation and fleet management for the entire region. The difference between costs and fares should be directly paid by the government.

The GCC model is currently active in over 30 Indian cities, including Delhi, Mumbai, and Pune. Under this model, public transport undertakings pay operators a per-km rate, while bearing the cost of creating behind-the-meter power infrastructure. The bus operator/OEM owns, maintains, and operates the electric buses, in addition to bearing the cost of developing charging stations and associated civil infrastructure in bus depots. For public transport undertakings, running an e-bus under a PPP-GCC model is 30-40% cheaper on a per-km basis in comparison to a traditional diesel bus.

The GCC model can be further strengthened by integrating an intelligent, data-driven transit management system and a dedicated payment security mechanism. For instance, the Delhi Integrated Multi-Modal Transit System (DIMTS) has implemented a data analytics and digital tracking-based bus management system to optimise routes and improve per-km revenues by ensuring regular utilisation along high-demand corridors. Today, DIMTS operates a fleet of 7,000-8,000 buses, comprising 2,000-2,500 e-buses and 5,000-5,500 CNG buses. Around 40-50% of this fleet is operated under the GCC model, supported by a three-month payment security mechanism similar to CESL's direct-debit model.

Building on this precedent, VER should establish an integrated bus transit authority with best-in-class route optimisation capabilities, supported by intelligent data management systems, and deploy 4,000 new electric and CNG buses under the PPP-GCC model by FY32.

2.4. Climate adaptability and resilience: Create blueprint to mitigate challenges such as floods, heat-stress, erosion and landslides

VER experiences a wide array climate-related challenges. Since 1891, the region has witnessed the impact of 29 cyclones, with prolonged periods of extreme rainfall, heavy winds and floods. Moreover, districts such as Srikakulam and Kakinada are at high risk of cyclones and 22% of the population in the Greater Visakhapatnam Region is at delete risk of floods. Since 1969, VER has spent more than 22 days per annum in disastrous heatwave conditions, with temperatures soaring towards extreme heat stress levels (beyond 46°C).

Additionally, 50-60% of VER (including all major cities) is at risk of PM 2.5 concentration beyond the CPCB permissible limits of 40 µg/m3, particularly between the months of November to February. 70-75% of AP's coastline is considered prone to coastal erosion, with several erosion-prone regions such as Kalingapatnam, Bheemunipatnam, Yarada, Pithapuram, and Uppada located in VER. Additionally, regions such as ASR, Parvathipuram Manyam and Visakhapatnam are prone to landslides and rockfalls.

Proposed interventions to achieve VER's aspiration

VER needs to create and implement a robust climate adaptability blueprint in the next 12-18 months. Some possible interventions in the blueprint may include:

1. Building nature-based drainage systems and flood retention lakes (similar to Hong Kong)
2. Building dykes, levees, and water barriers with storm gates (similar to the Netherlands)
3. Construction of structures such as seawalls and breakwaters, complemented by beach nourishment and dune restoration.
4. Water body renourishment, lake cascading and rainwater harvesting structures
5. Creating cyclone shelters and developing cyclone-resistant buildings
6. Mitigating landslides and rockfalls through bio-shield plantations
7. Enhancing mangrove restorations and targeting 30-50% green cover

3. Power infrastructure and green hydrogen blending

3.1. Power Infrastructure: Meet 50% of energy requirements from RE by FY32 (additional investments of $1.5-2 billion)

Aspiration for VER

VER should aspire to meet 50% of its energy requirements from RE by FY32 and create 20,000-25,000 MVA of transmission and 12,000-14,000 MVA of distribution network infrastructure. To meet this aspiration additional investments of $1.5-2 billion will be required in the region.

Context

VER consumes 25-30% of Andhra Pradesh's total electricity and consumes 40-45% of the state's industrial electricity. Currently, 20-25% of VER's energy requirements are being supplied through renewable energy sources.

Based on this Economic Master Plan, the peak power demand in VER is projected to increase from the current 4-4.5 GW to 10-12 GW by FY32. The major driving factors of this increase in peak demand include additional load from 2-2.5 GW of data centres as well as growth envisioned in manufacturing sub-sectors including steel, aluminum, petrochemicals and chemicals, pharmaceuticals and clean technology manufacturing among others.

Proposed interventions to achieve VER's aspiration

To meet its incremental energy demand by FY32 from sustainable sources, VER will need to focus on the following interventions:

1. **Increase share of renewable energy (RE):** VER should aim to increase the share of RE in the energy mix from 20-25% to 50% by 2030
2. **Generation and storage:** To meet anticipated demand, the distribution utility APEPDCL will need to plan for addition of 10-12 GW of generation capacity across solar, wind, and thermal sources. This will need to be complemented by 6-8 GWh of energy storage capacity to ensure load balancing and system reliability. The power generation infrastructure will require investments of $6-7 billion and 80-90% of these investments will come from the private sector. Since power generation units serve multiple locations and could come up in various parts of the state depending on its energy transition blueprint, these investments have not been included in the region's investment requirements
3. **Transmission network:** To ensure reliable power evacuation, VER will require an additional 20,000-25,000 MVA of transmission capacity across both Layer-1 (400 kV and above) and Layer-2 (220 kV to 132 kV) networks. This must be underpinned by a resilient transmission infrastructure incorporating N-1 redundancy and state-of-the-art grid automation technologies to enhance reliability and operational efficiency. Creating this additional transmission network capacity will require investments of $1-1.2 billion, with 30-40% met by the state transmission company (TRANSCO) and 60-70% met through private sector participation via tariff-based competitive bidding (TBCB)
4. **Distribution network:** VER will need to plan for and create an additional 12,000-14,000 MVA of distribution infrastructure, including 600-800 33/11 kV substations, 30,000-40,000 distribution transformers and augmentation of LT-HT lines. This will require investments of $600-800 million, with 30-40% met by the distribution utility APEPDCL and the balance met through central government grants such as RDSS

5. **Rooftop solar:** VER can also supplement and bolster its grid infrastructure by deploying 300-400 MW of rooftop solar across residential consumers to manage peak demand loads and ease stress on the distribution network by bringing power generation closer to the points of consumption

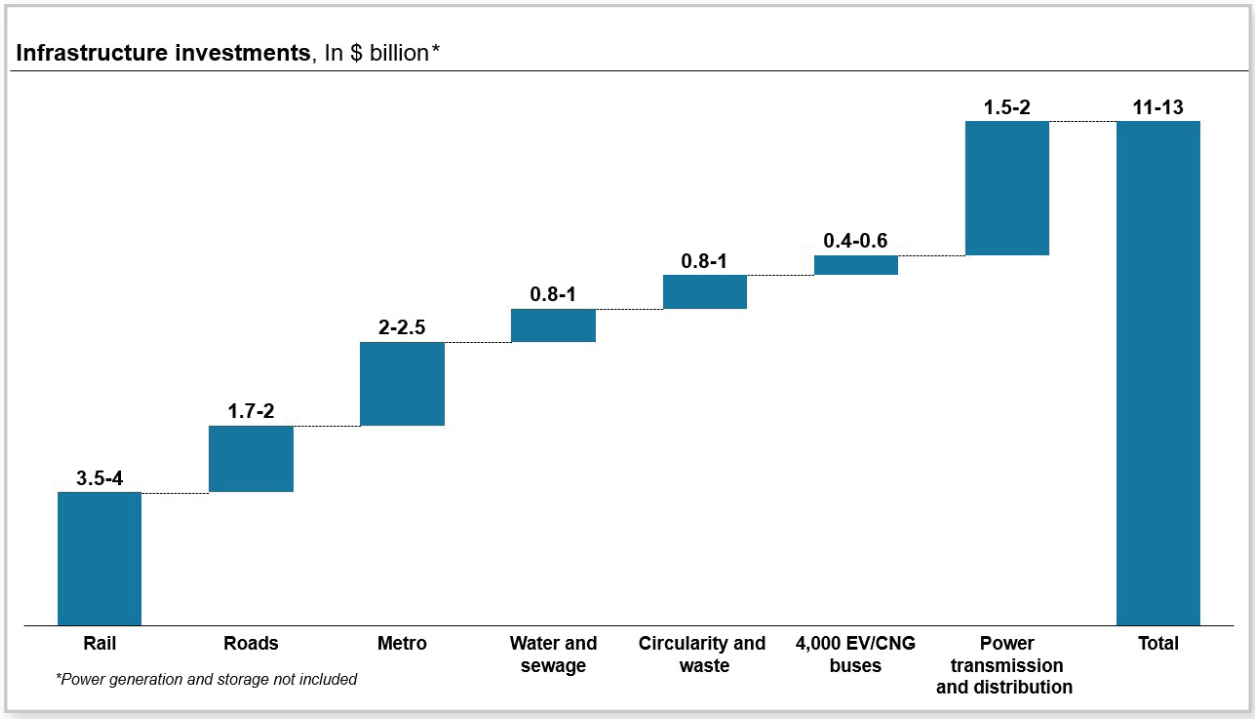
3.2. Green hydrogen blending: VER should target 8-10% green hydrogen blending in piped natural gas

With the development of NTPC's 0.5 MMTPA green hydrogen hub in VER and the completion of the gas grid (through the Kakinada-Srikakulam pipeline as recommended in this master plan), VER can set a target of achieving 8-10% green hydrogen blending in piped natural gas. This will require operational interventions to ensure pipeline readiness, including the deployment of hydrogen-blending skids and real-time gas composition analysers at key injection points, as well as end-user adaptations to ensure operational safety and efficiency.

Investments and impact

Overall, VER will require an additional $11-13 billion in investments for infrastructure, 45-50% of which will need to be secured from the central government. A detailed explanation of the sources of funding has been provided in the Chapter 'Financing and land requirements.' The aforementioned interventions across connectivity, sustainability and power infrastructure have the potential to add $4-6 billion in incremental GVA and create 300,000-350,000 new jobs by FY32

Figure 96: Investments required in sustainability and infrastructure

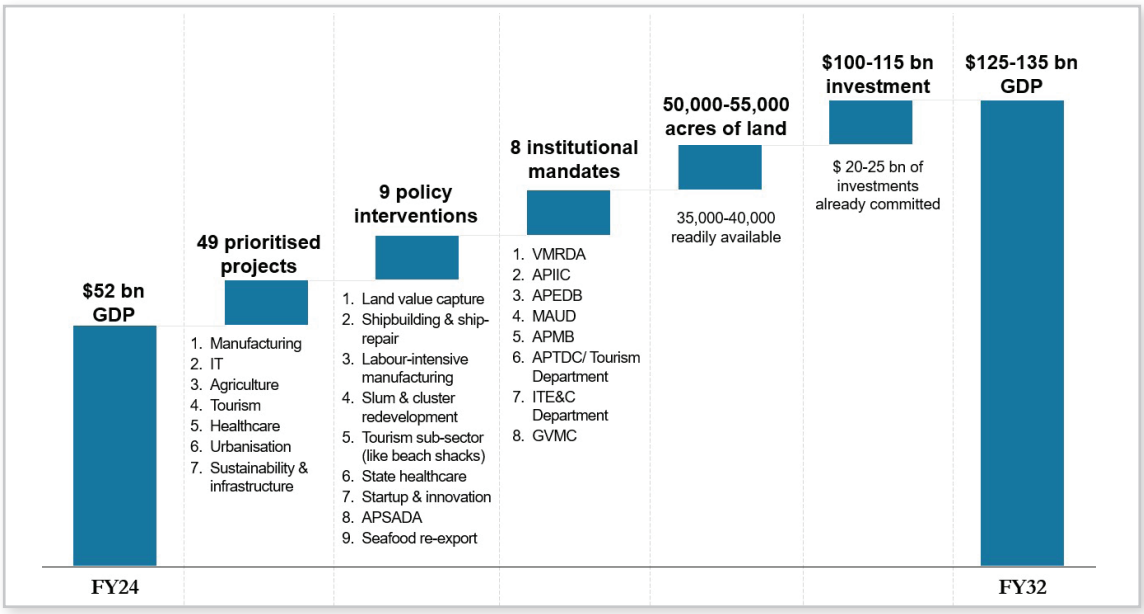


6 Projectisation, policies and institutional mandates

Context

This Economic Master Plan sets a bold ambition to take VER's GDP from $52 billion in FY24 to $125-$135 billion by FY32, adding an incremental $70-75 billion to the region's economy. To realise this bold aspiration, VER must ignite multiple growth cylinders simultaneously. Success hinges entirely on the parallel activation of 5 core elements i.e. projects, policies, institutional reforms, landbank creation and investment attraction as highlighted in Figure 97.

Figure 97: Blueprint of VER's Economic Master Plan



To ensure this ambitious target is met, the plan has been distilled into a list of 65-70 strategic interventions across projects, policies and institutional mandates (as shown in Figure 98). These interventions form the heart of the implementation strategy and will require synchronised efforts from relevant state and central government agencies.

Figure 98: Strategic interventions for VER

49 prioritised projects	Selected initiatives that will drive the majority of physical and economic development over the next 7-10 years
9 enabling policies	Strategic policies are designed to create a conducive environment for investment, innovation, and growth
8 institutional shifts	Prioritised measures to strengthen organisational capabilities and establish necessary coordination mechanisms between key agencies/ departments

Subsequently, this section provides a detailed breakdown of the following:

- Master-list of the 65-70 proposed interventions

- Geographical visualisation of all land-based projects
- Deep-dive into the specific policy interventions required
- Overview of the institutional shifts necessary for success
- Outline of the support required from the central government

Master-list of the proposed interventions

Figure 99: 65-70 interventions prioritised in this Economic Master Plan

49 Prioritised Projects

Global port-proximate manufacturing hub

1. Establish 25 MMTPA steel, 12 MMTPA pellet and 2,000 acres downstream steel hub in Nakkapalli and Visakhapatnam
2. Develop a 1.5 MMTPA mixed-feed cracker and 2,000 acres downstream and speciality chemical hub in Srikakulam
3. Complete 150-175 km unfinished stretch of the Kakinada-Srikakulam gas pipeline and establish dedicated gas terminal at Kakinada (20-30 MMSCMD capacity)
4. Develop port capacity of 435 MMTPA across four existing and two new ports (Mulapeta, Kakinada Gateway), and create two 400 acres MMLPs in Anakapalli and Srikakulam
5. Create 3 pharmaceutical parks: 3,000 acres life-sciences park (Srikakulam), 2,000 acres bulk drug park (Nakkapalli) and 500 acres MedTech zone (Anakapalli)
6. Establish a 0.5 million GT shipbuilding, ship-repair and ancillary cluster at Mulapeta
7. Set up 3 parks of 200-400 acres each, for labour-intensive manufacturing of toys, furniture and footwear in Nakkapalli, Vizianagaram and Srikakulam
8. Develop a 500-1,000 acres multi-product electronics and electronic components manufacturing zone at Visakhapatnam
9. Create a 500 acres multi-product defence manufacturing hub in Anakapalli
10. Develop a 2,000 acres multi-product downstream clean-tech hub in Anakapalli, 0.5 MMTPA green hydrogen hub in Pudimadaka and 1 MMTPA green ammonia and 2 GW electrolyser manufacturing in Kakinada
11. Develop a 0.5-1 MMTPA aluminum smelter with 6-8 MMTPA captive bauxite and 2-2.5 MMTPA alumina refining capacity, and a 500 acres downstream park
12. Establish a titanium dioxide manufacturing unit with an annual capacity of 50,000-100,000 tonnes operational by FY32, supported by beach sands mineral extraction in Srikakulam
13. Assist in the development of 2-4 private multi-product manufacturing parks, including the ones under-development in Kakinada and Vizianagaram

Next-gen IT, data centre, AI and innovation hub

14. Complete development and investment attraction for Madhurawada IT park (1,000 acres)
15. Develop an IT, GCC and data centre hub at Kapuluppada (500 acres)
16. Create an IT and data centre hub at Anandapuram (300 acres), hosting Google's first AI hub in India (80-100 acres), featuring a gigawatt-scale data centre campus in Tarluvada
17. Establish an education, skilling and innovation hub near IIM Vizag (150 acres)
18. Emerge as a major international subsea gateway by developing AP's first Cable Landing Station (CLS) in Visakhapatnam
19. Create a ₹100 crore Fund of Funds (FoF), privately managed by a state managed AMC, to invest in startups working in 3-4 strategic areas

Global agriculture leader

20. Increase VER's egg production from 13-14 billion to 25-30 billion by FY32 by creating 700 new-age poultry farms, establishing 10 new hatcheries, targeting 30% farm automation, establishing an ICAR-CARI like research centre, and improving overall ecosystem to facilitate processing and exports.
21. Triple fisheries production from 1 million tonnes to 2.5-3 million tonnes by:
    - **Aquaculture:** Increasing area under cultivation by 70,000 acres and quadrupling fish and doubling shrimp yield by creating a conducive ecosystem (1 quarantine management centre, 0.5 million tonnes of additional cold storage, farm automation and re-export support)
    - **Capture fisheries:** Creating 5 greenfield fishing harbours (including Pudimadaka, Uppada, and Budagatlapalem), and assisting in procurement of deep sea vessels and upgradation of existing fleet
    - **Seaweed:** Expand area under cultivation to 13,000 acres, creating drying infrastructure and incentivising early adopters of tube-net farming
22. Double value-added production of 5 crops (coffee, oil palm, banana, cashew, coconut) via an end-to-end value chain approach involving improvement in inputs used, rejuvenation of senile plantations, and creating drying, cold storage and processing infrastructure
23. Develop the East Godavari belt as India's nursery capital with 10-15% exports, through the development of 3-5 additional modernised nursery zone
24. Create 3 food-processing parks of 200 acres each (1 aquapark in Kakinada and 2 multi-product food processing parks in Vizianagaram and Anakapalli)

Renowned tourism attraction

25. Create Vizag Bay City as a 40 sq. km coastal hub with 5 developed beachfronts, 2,000-2,500 additional room keys, 80-100 beach shacks, 50+ fine dining restaurants/ cafes, 8-10 beach clubs, a world-class adventure/theme park, a marina with 5-6 jetties, shopping complexes and a water sports hub
26. Develop Visakhapatnam Cruise Terminal into a pivotal cruise node attracting regional, national and international cruise liners (4-5) and creating seamless facilities, and creation of a 50-100 acres terminal proximate mixed-use retail and commercial complex
27. Develop and promote the 'Trinity of Faith' temple circuit as a global pilgrimage
28. Promote the 'Lotus Trail Buddhist Circuit' by restoring Pavurallakonda/ Thotlakonda into a Buddhist heritage featuring 1-2 temples, a new-age monastery, an archaic stupa, and a 'Samten Hill' like complex (100-500 acres)
29. Developing the Bhogapuram Aerocity (300 acres), as an integrated services hub with a focus on aircraft MRO services and MICE tourism (hosting a 70 acres world-class convention-cum-exhibition centre)
30. Master plan Kailasagiri as a wellness, recreation and adventure sports focused experiential hub (400 acres)
31. Creating a world-class adventure/ theme park in the Vizag Bay City (75 acres)
32. Develop an immersive experience centred on coffee and tribal culture in Araku, featuring a cultural village, coffee tasting centres, and variety of lodging options
33. Develop 5 additional experiential tourism sites including Godavari Pushkaram, Lambasingi, Kambalakonda, Borra caves and Etikopakka

National and international healthcare hub

34. Create a world class, mixed-use international care hub near the upcoming airport featuring 5,000+ hospital beds across 15+ hospitals, a comprehensive skilling ecosystem with 2 medical and 10-12 nursing colleges, and a robust wellness and elderly care ecosystem (700-800 acres)

Planned urbanisation and housing

35. Master plan and develop at least 7 mixed-use industrial cities such as the Nakkapalli steel city and the Mulapeta industrial city
36. Master plan and develop 6 mixed-use service hubs such as the IT and data centre hub at Kapuluppada and an integrated airport proximate international healthcare hub in Vizianagaram
37. Master plan and develop Vizag Bay City and Vizag 2.0 as best-in-class brownfield urban cities

38. Ensure 'Housing for all' by creating 650,000-750,000 new housing units across the 15 new cities, 6-8 cluster redevelopments and 10-12 TOD nodes proposed
39. Redevelop 100% of the 130,000 slum households on GoI land by FY32
40. Undertake transit-oriented development around 10-12 major transit stations (75,000-80,000 units)
41. Undertake cluster redevelopment of 6-8 dense localities such as Purna Market, Venkateswara Nagar etc.

Lighthouse of sustainability and best-in-class infrastructure

42. Expedite development of 5 ongoing and 7 new railway projects
43. Fast-track development of 8 ongoing and 9 new road projects
44. Combine and complete development of phase 1 and 2 of the Visakhapatnam Metro (77 km) by 2030
45. Create a 100-200 acres circularity park capable of processing plastic, C&D waste, automative scrap and e-waste
46. Develop additional sustainability infrastructure including 1,800-2,000 MLD of water, 1,700-1,900 MLD of sewage, and 6,000-8,000 TPD of waste processing capacity
47. Procure and deploy 4,000 new electric/CNG buses in VER to create last mile and feeder bus connectivity
48. Develop distribution and transmission infrastructure to meet 10-12 GW peak demand
49. Create a detailed climate adaptability blueprint and implementation plan

9 Policy unlocks

6 new launchpad policies	3 modified policies
1. Land value capture/ monetisation policy	7. AP Innovation & Startup Policy 4.0
2. Dedicated shipbuilding and ship-repair policy	8. Andhra Pradesh State Aquaculture Development Authority Act
3. Labour-intensive manufacturing policies for toys and furniture	9. Seafood re-export policy
4. Tourism sub-sectoral policies including beach shack, homestays and guidelines for attracting investors	
5. Slum rehabilitation and cluster redevelopment policy	
6. State healthcare policy	

8 Institutional Mandates

1. Visakhapatnam Metropolitan Region Development Authority (VMRDA)
2. Andhra Pradesh Industrial Infrastructure Corporation (APIIC)
3. Andhra Pradesh Economic Development Board (APEDB)
4. Andhra Pradesh Maritime Board (APMB)
5. Andhra Pradesh Tourism Development Corporation (APTDC)/ Tourism Department, GoAP
6. Information Technology, Electronics and Communications Department (ITE&C), GoAP
7. Municipal Administration and Urban Development Department (MAUD), GoAP
8. Greater Visakhapatnam Municipal Corporation (GVMC)

The list of projects, policies and institutional shifts identified across the growth drivers are expected to materialise into:

$60-70 billion	Incremental GVA potential by FY32
$100-115 billion	Total investment required by FY32
$85-100 billion	Private investment to be attracted by FY32
2-2.4 million	Incremental jobs created by FY32

Geographical landscaping of projects

This section provides the geographical representation of the prioritised projects.

Figure 100: Major ports and manufacturing hubs

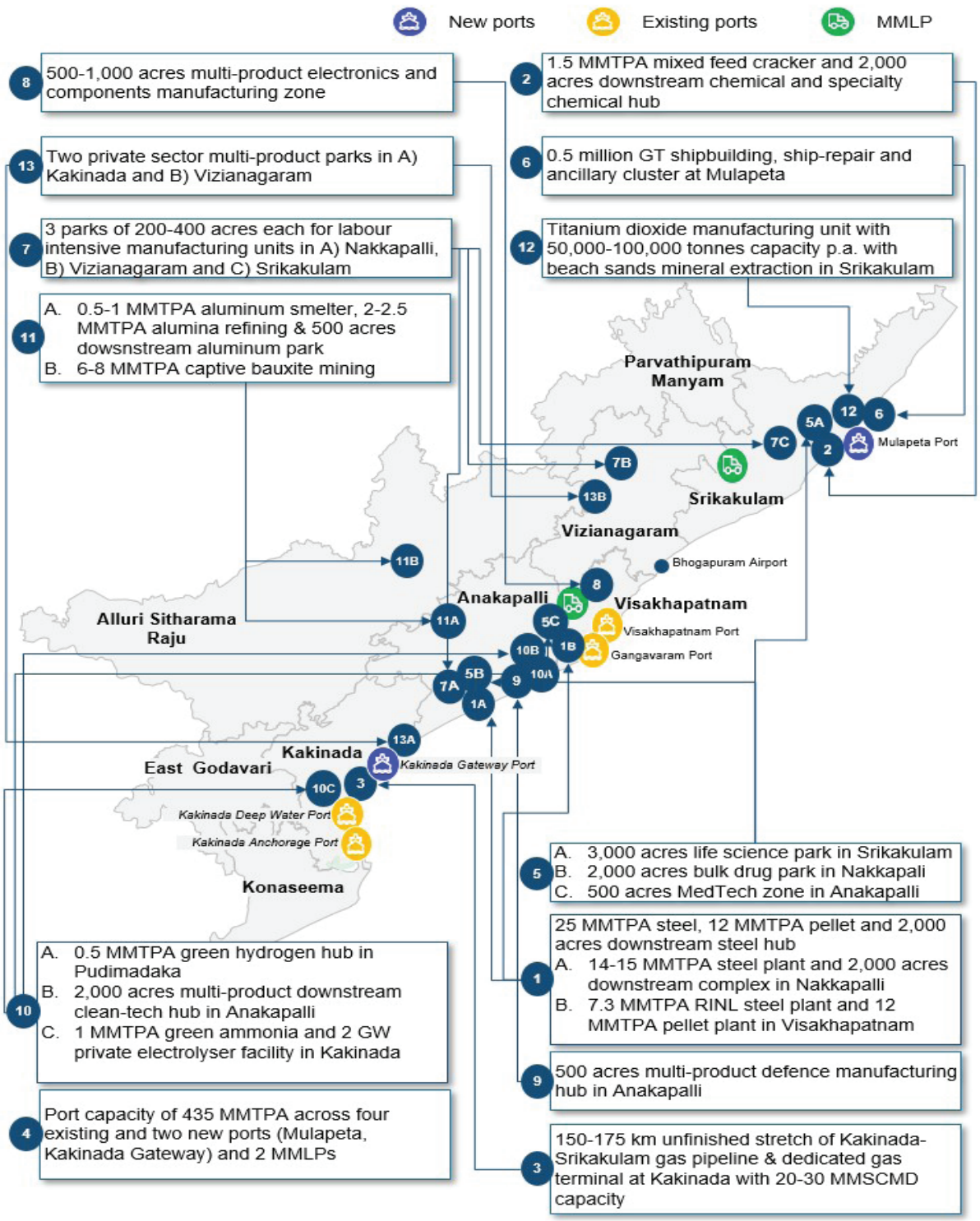


Figure 101: Major agriculture hubs

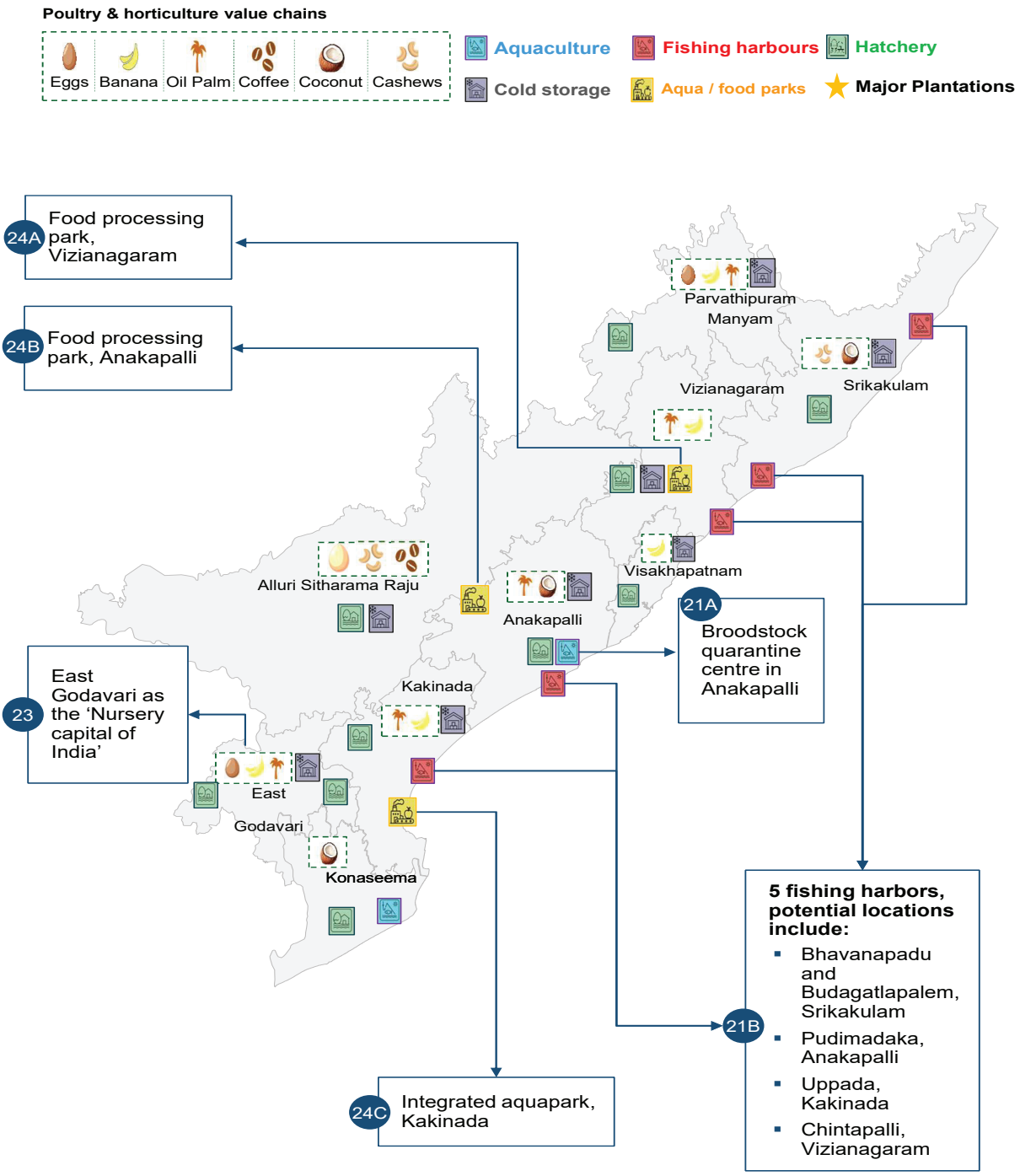


Figure 102: 6 mixed-use services hubs and Cable Landing Station (CLS)

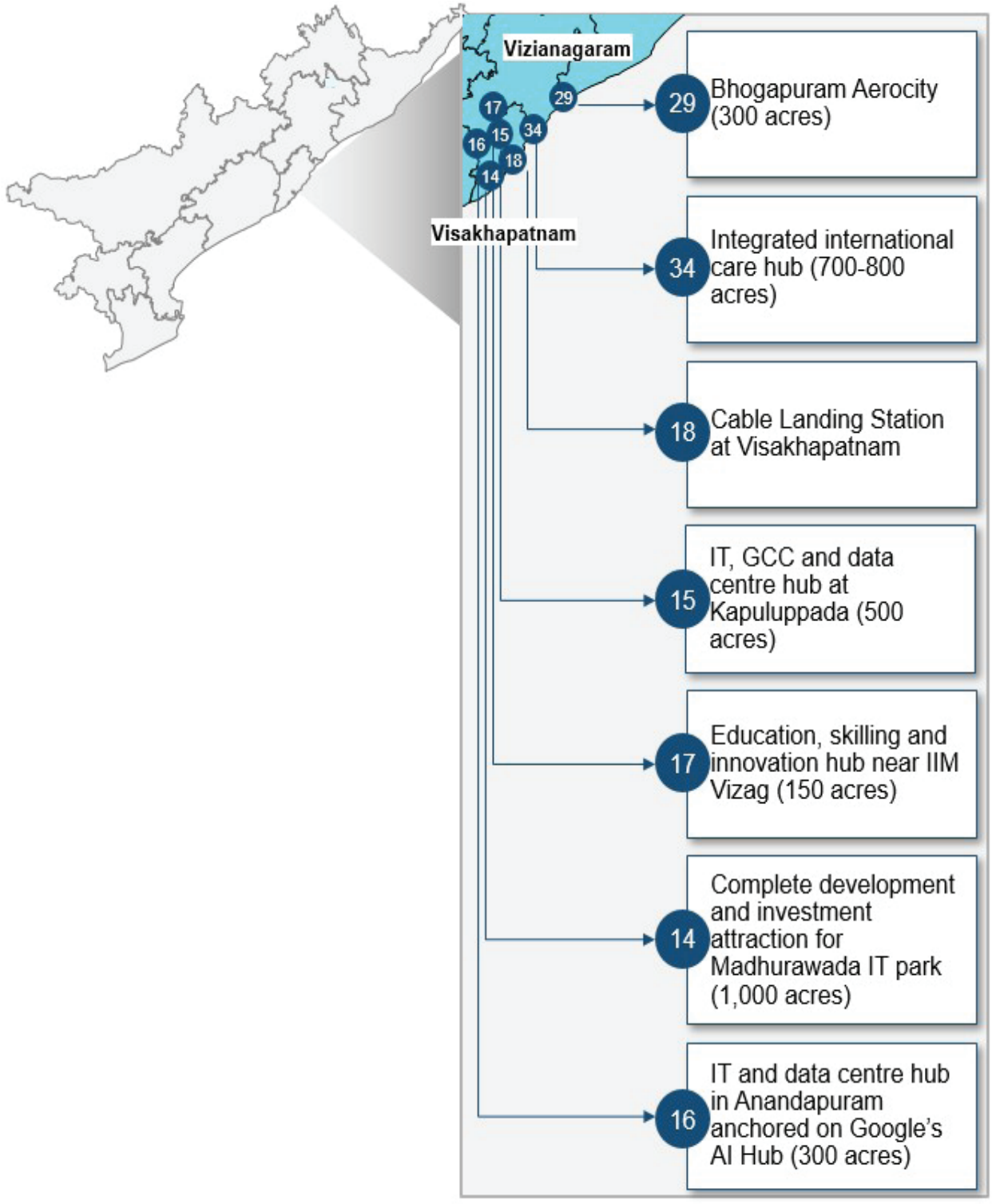
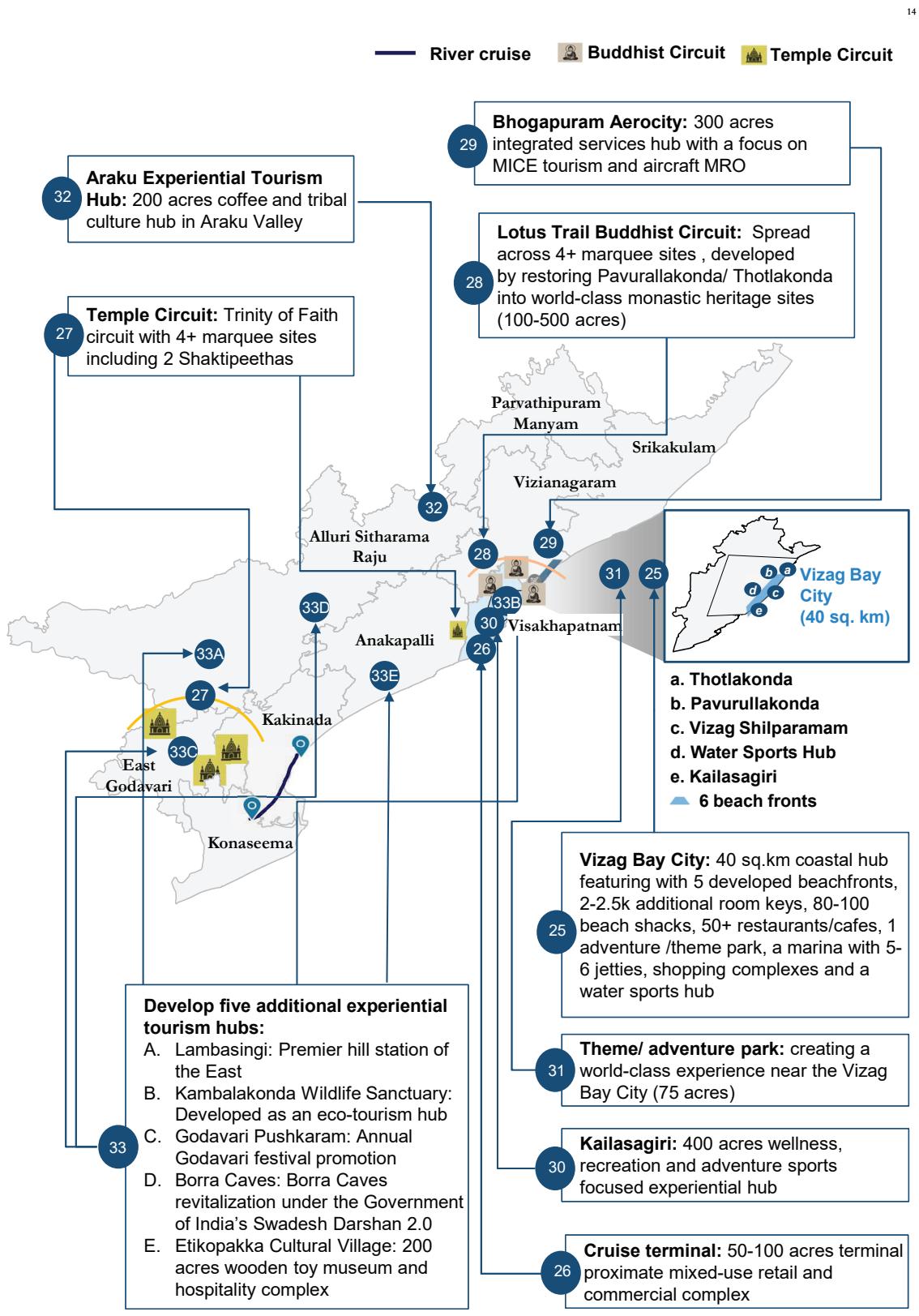


Figure 103: Major tourism hubs and projects



Proposed policy interventions

The policy interventions have been divided into 1) six new launchpad policies and 2) updates to 3 existing policies as detailed below:

1. 6 new launchpad policies

The Government of Andhra Pradesh should formulate 6 new launchpad policies to attract private sector investments and facilitate implementation of the Economic Master Plan as detailed below:

1.1. Land value capture/land monetisation policy

Owing to the planned urbanisation and housing, VER can expect a significant increase in land value. This increased land value can be leveraged to pay for substantial infrastructure that is being built. To share the economic gains from this increased land value, a dedicated land value capture/ monetisation policy should be drafted. The state of Maharashtra has adopted a similar policy in the Mumbai Metropolitan Region. Key recommendations for the AP policy may include:

- Creating a land bank through government land pooling and acquisition in VER
- Levying infrastructure premium per square foot on all new building permissions (including on base FAR)
- Selling additional FAR in TODs, specific planned cities and redevelopment/ densification areas
- Levying specific charges for changes in zoning
- Allowing land pooling/acquisition and TOD by Regional Development Authorities
- Levying 1% additional stamp duty, shared between Regional Development Authority and municipality on a 50:50 basis
- Creating ‘Transferable Development Rights’ (TDR) as an instrument
- Levy of property and utility charges by the region’s Special Planning Authority (SPA)/ New Town Development Authority (NTDA)

1.2. Dedicated policy for shipbuilding and ship-repair

VER is aspiring to develop one of India’s largest shipbuilding, ship-repair and ancillary manufacturing clusters near Mulapeta port, with an aspiration to have a capacity of 0.5 million GT by FY32. To facilitate the development of these industries, the state should develop a dedicated policy for shipbuilding and ship-repair, with focused incentives such as:

- Construction milestone linked Fixed Capital Investment (FCI) subsidies

- Incentives for setting up skill development facilities for courses such as welding, metal fabrication and electricals

1.3. Slum rehabilitation and cluster redevelopment policy

A new slum rehabilitation policy will be needed to facilitate the redevelopment of nearly 130,000 slum households in VER as well as the redevelopment of congested, dense clusters inside the city. This policy should align with and leverage the Government of India's 'Housing for all' scheme and provide incentives for developers such as additional FAR and TDR. Additionally, the policy should focus on in-situ rehabilitation wherever possible.

1.4. Labour intensive manufacturing policy for toys and furniture

To support its aspiration to create 3 multi-product plug-and-play labour-intensive manufacturing clusters in Nakkapalli, Vizianagaram and Srikakulam, VER will need a strong policy framework. Policies for two labour-intensive sub-sectors already exist including 1) AP Textile, Apparel and Garments Policy 4.0 (2024-29) and 2) The AP Leather and Footwear Policy (LEAF) 4.0. As next steps, the state should develop focused policies for the toys and furniture sub-sectors.

The policy should include best-in-class provisions like providing single window clearance and plug-and-play infrastructure with pre-approved sheds, shared warehouses, logistics facilities, utilities etc. to attract key investors.

1.5. Operating guidelines and sub-sectoral policies for tourism

To establish VER as a renowned tourism hub, it is essential to offer best-in-class incentives to attract private investors, leading developers and destination management organisations. To fulfil this aspiration, formulating a forward-looking tourism policy framework will be necessary.

While the state's tourism policy 2024-29 provides robust fiscal incentives, certain new sub-sectoral policies/ operating guidelines, focused on boosting experiential, coastal and MICE tourism will be required. The following interventions are proposed:

- Developing detailed guidelines (including various incentives and land allotment schemes) and operating procedures to attract investments in tourism infrastructure like hotels, resorts, marinas, experiences etc.
- Setting up a MICE Tourism Bureau for attracting large exhibitions and conferences to VER
- Creating a 'Homestay Policy' for ratification, tiering and continuous auditing of homestays based on a common set of criteria
- Developing a 'Beach Shacks Policy' offering affordable license fees, pre-approved shack zones etc. to enable effective beach front development

- Permitting deployment of party/house boats by private tour operators
- Allowing extended operating hours for entertainment venues
- Earmarking ₹150-200 crore as VER's tourism promotion budget

1.6. State healthcare policy

Transformation of VER from a regional medical centre to a national and international healthcare hub, will require attracting 15-20 anchor hospitals, world-class medical research and skilling institutions, and senior and wellness ecosystem investors. A comprehensive state healthcare policy is essential to improve ease of doing business and investor attraction. The policy may include the following elements:

- At-cost or subsidised land allotment and Fixed Capital Investment subsidies for first 20% anchor institutions investing in designated healthcare development zones
- Incentives for development of care infrastructure such as mobile medical units, geriatric wards, old-age homes, and home-based healthcare delivery
- Single-window approvals for senior living and other marquee healthcare projects
- Establishment of a CoE for geriatric medicine in Visakhapatnam, as proposed in the 'Swarna Andhra@2047' vision
- Further, targeted efforts would be required to enable the ecosystem such as streamlining medical visa process and entering bilateral agreements for healthcare worker exports

2. Amendments to 3 existing policies

2.1. AP Innovation and Startup Policy

To boost innovation and startup activity in VER, a comprehensive policy framework that combines financial incentives, infrastructure support, and ecosystem development is required. The Andhra Pradesh Innovation and Startup Policy 4.0 fares well with leading states in innovation such as Karnataka and Tamil Nadu. Some of the key additions required in the policy are as follows:

- Set up of Fund of Fund (FoF) with ₹100 crore corpus for VER managed by a separate asset management company like the Karnataka Asset Management Company (KAMCO) which has an AUM of $50 million across 6 KITVEN funds (e.g. Fund 1: IT, Fund 5: Deep-tech like AI, ML)
- Conduct 2-5 national level startup forums, competitions and conclaves per year in VER
- As part of the Ratan Tata Innovation Hub initiative, 1 spokes each in Visakhapatnam and Rajahmundry should be set up along with setup of 5-10 new incubators/ accelerators

2.2. Andhra Pradesh State Aquaculture Development Authority Act

To streamline governance of aquaculture in Andhra Pradesh, the APSADA Act should be amended to reflect evolving needs of the sector. Provisions may include:

- Modernising farm licensing system to allow: 1) multi-species cultivation under a single license, and 2) provisional licensing to enable operation commencement while awaiting final approvals
- Expansion of mandate to become a nodal agency for setting benchmark prices of aquaculture produce
- Potential expansion of mandate to become a nodal fisheries authority covering marine capture fisheries including harbour creation and governance

2.3. State support framework for seafood re-export operations

To position VER as a competitive global seafood re-export hub, a targeted re-export policy is essential. Despite being India's largest seafood producer, high port costs and procedural delays significantly reduce export competitiveness for AP. The policy should consider the following:

- Exempt seafood re-exporters from the prawn cess of 0.25%, which directly impacts margins
- Rationalise clearance fees at Vizag port, currently around $1,000 per container to global benchmarks (e.g. $350 in US, Vietnam)
- Introduce single-window clearance mechanism to cut container turnaround times from 18-20 days currently to under 3 days, aligning efficiency with leading Asian hubs like Vietnam, Thailand

Proposed institutional mandates

For the implementation of this Economic Master Plan, 8 government institutions will play a critical role, taking charge of the 49 prioritised projects. To enable this transformation and ensure clear accountability, several changes are required. The section below details the nodal agency, the key projects allocated to them, and the specific support required to ensure their success.

1. Visakhapatnam Metropolitan Region Development Authority

VMRDA will play a central role in implementing the VER Economic Plan, undertaking transformative projects such as development of service hubs, infrastructure and connectivity as nodal implementing agency. It would thus need significant step-up in its mandate and execution capabilities as detailed below:

1.1. Expansion of jurisdiction

To ensure unified economic and spatial planning of the region, bringing all urban development authorities under a new unified VER authority has been recommended. This new authority would have jurisdiction on nearly triple the VMRDA area (21,880 vs. 7,328 square kilometres) as detailed below:

- Srikakulam Urban Development Authority (SUDA): 3,824 square kilometres
- Bobbili Urban Development Authority (BUDA): 3,080 square kilometres
- Visakhapatnam-Kakinada PCPIR Urban Development Authority (VK PCPIR UDA): 640 square kilometres
- Kakinada Urban Development Authority (KUDA): 2,610 square kilometres
- Rajamahendravaram Urban Development Authority (RUDA): 3,142 square kilometres
- Amalapuram Urban Development Authority (AMUDA): 1,256 square kilometres

VMRDA should be assigned the additional responsibility of acting as the PMU for the implementation of the VER growth hub project, under the aegis of this new authority. It will need to create an 8-10 member team for the same and will be responsible for conducting weekly reviews to maintain program momentum and provide timely issue resolution.

1.2. Expansion of mandate

VMRDA needs to expand its mandate to include:

- Economic Master Planning of VER every 5 years, or sooner as need be
- Planning and creating affordable housing
- Creating tourism infrastructure
- Transportation master planning for the entire region with execution of select infrastructure projects
- Township and city creating through Special Planning Authorities (SPAs) (E.g. Vizag Bay city) on the lines of Navi Mumbai by CIDCO
- Targets for investment attraction
- Creating 6-8 business hubs on the lines of BKC by MMRDA
- Planning and implementing bulk infrastructure (water, sewage, CBG plants etc.)

In addition, a senior IAS officer should be appointed as the Metropolitan Commissioner to take charge of this expanded mandate.

1.3. Increase annual spend from ₹ 1,000 to ₹ 8,500 crore by FY32

To play a bigger role in achieving, VER's aspirations, VMRDA will need to become financially self-reliant by:

- Creating a land bank of over 15,000 acres and monetising it over the next 10-20 years

- Levying additional infrastructure premium on built-up FSI for all projects in VMRDA's jurisdiction (shared with local bodies)
- Levying additional stamp duty of 1%, over and above current levies, shared with other local bodies
- Raising loans/grants from multi-lateral agencies (ADB, JICA) for financing core infrastructure
- Raising funding under various schemes of the central government/state government
- Raising commercial loans using land banks, other assets, future revenue streams as collateral, possibly with state government guarantees
- Levying property and utility charges wherever VMRDA is the SPA/NTDA (New Town Development Authority)

1.4. Change in organisation structure and increase in capabilities

- A senior IAS officer will need to be appointed as the Metropolitan Commissioner
- New positions such as Additional Metropolitan Commissioner, Joint Commissioner, Chief Engineer will need to be created to strengthen execution capabilities
- An 8-10 member PMU for the G-Hub project will need to be set up under one of the Additional Metropolitan Commissioners
- VMRDA currently employs 169 people (out of its sanctioned strength of 318) and would require nearly 400 people for the expanded mandate
- Existing wings like engineering and finance would need to be strengthened
- Experts and external consultants will need to be onboarded
- New organisation verticals such as tourism, affordable housing, bulk infrastructure and transport will need to be created

1.5. End-to-end planning and execution of 8-10 marquee projects

VMRDA should play a central role in implementing projects including development of service hubs, housing, and infrastructure in close coordination with line departments such as IT, Tourism, APIIC, APSHCL etc. Select projects proposed for execution by VMRDA should include:

- Development of Vizag Bay City, 40 square kilometres proposed mixed-use brownfield city with 3-5 world-class beachfronts, 2,000-2,500 hotel rooms, 80-100 beach shacks, 5-6 beach clubs, a marina with 5-6 jetties, 2-3 shopping complexes, water sports zones and proximate marquee tourism attractions like India's best adventure/theme park
- Create a world class, mixed-use care city spread across 700-800 acres near upcoming airport in Vizianagaram featuring over 5,000 hospital beds, 15+ hospitals, a comprehensive medical and nursing college ecosystem, and a robust wellness and elderly care ecosystem

- Undertake housing projects including cluster redevelopment of 3-4 dense clusters and transit-oriented development near 4-5 transit stations in urban areas
- Development of 1-2 integrated IT and data centre hubs in the region
- Undertaking a significant facelift of the approach road and creating a 50-100 acres mixed-use tourism and retail complex near the cruise terminal
- Execution of several last mile connectivity projects (roads, skywalks etc.)

2. Andhra Pradesh Industrial Infrastructure Corporation (APIIC)

APIIC is the primary agency responsible for managing industrial area development including providing land, trunk infrastructure, connectivity and regulatory support in Andhra Pradesh. APIIC should be the nodal authority for the development of 15-20 sub-projects across 12-15 manufacturing nodes and 7+ industrial cities and 1 (out of 3) IT hub. The following mandates are suggested for APIIC:

2.1. Land acquisition for industrial cities and services hubs

APIIC is the designated nodal agency for managing land banks in Andhra Pradesh. It has a centralised land bank of over 140,000 acres across the state with 40,000 acres in VER.

Interestingly, land for the development of industrial cities is available. Further, APIIC also has land banks at Madhurawada and Kapuluppada,well-suited for the development of planned IT and data centre parks.

For effective implementation of this master plan, APIIC would have to additionally acquire:

- 10,000-13,000 acres of land for development of manufacturing projects along the 12-15 industrial nodes
- 1,000+ acres of land for development of various services hubs

2.2. Ancillary infrastructure and amenities around sites

In addition to providing land, APIIC will be the primary agency responsible for a development of trunk infrastructure including road connectivity, water, sewage and other utilities across VER's 12-15 manufacturing nodes.

2.3. Nodal authority for creating industrial cities

The 7+ planned industrial cities should be developed as world class industrial cities by APIIC. Traditionally land in industrial estates has been allocated plot by plot, with limited master planning for housing, social amenities, transportation or circularity. This has led to sporadic and unorganised housing development around the industrial estates and poor quality of life.

Transitioning from industrial estates to industrial cities is essential to attract skilled talent and reduce urban sprawl. To achieve this, APIIC should adopt a holistic master planning

approach rather than conducting fragmented plot-wise allocation. This must include:

- Housing for the workforce (dormitories, hostels, and LIG housing)
- Amenities for liveability and talent attraction (ALTAs) such as schools, hospitals, open spaces and retail
- Robust transportation network with intra-city buses, e-rickshaws, walkways, and inter-city metro, rail links
- Special focus on circularity, with 100% recycling of wastewater, plastic and metals

2.4. Minimising cost of doing business

To attract investment and ensure VER's competitiveness in manufacturing, APIIC should focus on minimising the cost of doing business through affordable logistics and power costs, including undertaking electricity distribution franchisee for the industrial cities to provide affordable and reliable power.

2.5. End-to-end planning and execution of all industrial and select large-scale projects

APIIC will be the nodal authority for end-to-end development of the 7+ industrial cities and would also be a key agency for the development of large-scale services hubs like integrated IT and data centre parks etc. Select marquee projects that APIIC should undertake, include:

- 2,000 acres downstream steel hub at Nakkapalli
- 3,000 acres greenfield life-sciences and pharmaceutical park proposed in Srikakulam
- 600 acres of plug-and-play sheds to attract labour-intensive manufacturers for toys, furniture, leather & footwear
- One of the two proposed integrated mixed-use IT and data centre parks planned in Visakhapatnam

3. Andhra Pradesh Economic Development Board (APEDB)

APEDB acts as the nodal agency to attract investments to AP. Its core mandate is to serve as a single-window interface for investors, expediting clearances, providing best-in-class EoDB, and facilitating public-private partnerships. To achieve the aspirations of this Economic Master Plan, VER will need to attract $85-100 billion in private investments. APEDB will have to:

3.1. Attract anchor investors across key growth drivers

APEDB will need to attract anchor investors across prioritised sectors, for example

- In co-ordination with the IT department, attract 30+ investors to become an IT, Data

Centre and GCC hub including 1) 5-10 marquee IT organisations, 2) 1-2 hyperscale data centre companies and 3) 1 cable landing station operator and 4) 5-10 domain specific anchor GCCs

- In co-ordination with the industries department, attract 15+ marquee anchor investors across manufacturing sub-sectors including 1) one shipbuilding major like Hyundai Heavy Industries or Imabari; 2) large white good manufacturers like LG, Samsung for electronics and 3) anchor investor for petrochemical cracker like Saudi Aramco, GAIL, Haldia
- Attracting globally renowned investors for other projects like 1) theme/adventure park operator of national/ international repute such as the Universal Studios, Legoland, or Sea World; 2) 1-2 industrial associations/private anchors for proposed exhibition-cum-convention centre in Bhogapuram

3.2. Appoint dedicated investment officials in VER

To expedite investment attraction for the growth hub project, APEDB should identify and appoint VER nodal officers across select agencies identified as key implementing partners for this Economic Master Plan including APIIC, VMRDA and APMB.

4. Andhra Pradesh Maritime Board (APMB)

APMB's current mandate includes coastal economic zone development, port proximate area development, port management and port infrastructure development in Andhra Pradesh. APMB will act as the nodal agency responsible for materialising VER's ports, logistics and shipbuilding vision by undertaking interventions such as:

4.1. End-to-end ownership of port and shipping related projects

- Expediting phase-1 (23.5 MMTPA) development of the under-construction Mulapeta port
- Developing trunk infrastructure for the proposed shipbuilding, ship-repair and ancillary manufacturing cluster and capacity expansion of the Mulapeta port
- Acting as nodal agency for regulatory coordination and approval for expansion and development efforts of private ports such as the 16 MMTPA greenfield Kakinada gateway port, expansion of the Kakinada deep water port and the Gangavaram port

4.2. Land acquisition

In addition to APIIC, APMB will be a key agency acquiring land for the development of ports, shipping harbours, shipyards and port proximate manufacturing clusters. APMB already has a land reserve of around 4,000 acres, earmarked for phase 1 development of the Mulapeta port. For effective implementation of this master plan, APMB would have to

additionally acquire 5,000-6,000 acres for:

- Capacity enhancement of the Mulapeta port into a 100 MMTPA port by FY32
- Creating a shipbuilding, ship-repair and ancillary manufacturing ecosystem near the Mulapeta port

5. Andhra Pradesh Tourism Development Corporation (APTDC) / Tourism Department

The tourism department along with APTDC, is responsible for the development of tourism in Andhra Pradesh. APTDC is the nodal agency for tourism promotion, infrastructure development, and investor attraction. In addition to the creation of select policies and operating guidelines detailed above, APTDC will require significant institutional strengthening:

5.1. Step-up private investment attraction mandate

In line with the tourism interventions prioritised in this Economic Master Plan, total investment of $4-5 billion will need to be attracted for VER alone.

APTDC (in collaboration with APEDB) will have to strengthen its capability and capacity to lead this investment attraction mandate.

5.2. Create and manage a dedicated VER tourism promotion corpus

APTDC will be required to set up and manage tourism promotion budget of ₹150-200 crore ($20-25 million) per annum for VER.

5.3. Undertake development of select tourism projects

APTDC should be the nodal agency for authorising and supporting all tourism projects. In addition, it will also be required to undertake end-to-end development of select sites like:

- Tourist hubs in tribal areas such as Araku and Lambasingi in conjunction with the ITDA (Integrated Tribal Development Agency)
- Experiential tourism hubs like Etikopakka
- Water sports adventure hub and certification institute at Mangamaripeta

6. IT, Electronics and Communications Department (ITE&C)

The ITE&C department of Andhra Pradesh is responsible for policy formulation, investment promotion, IT infrastructure creation and skill development. The IT department, working closely with APIIC and VMRDA, will facilitate the development of IT parks and the innovation hub in VER. The department should undertake the following:

6.1. Best-in-class EoDB and policy architecture

- Providing best-in-class policy and incentives linked to construction milestones, jobs created, investment in R&D etc.
- Maintaining inventory of pre-approved land parcels with legal and environmental clearances, ready-to-move-in Grade A office spaces and integrated plug-and-play campuses to enable faster time to market for potential investors

6.2. Investor attraction and promotion activities

- Attracting 2-3 private developers for proposed IT and data centre parks
- Invite 15-20 first-time IT companies (e.g. Wipro, IBM, HCL, Capgemini, Cognizant) in VER, committing 15,000-20,000 seats each
- Milestone-based incentives to existing IT establishments for scaling up their presence
- Attracting top 5-8 data centre companies such as AWS, Microsoft Azure, NTT etc. in the next 24 months
- Attracting 15-20 marquee GCCs (potentially start with focus on sectors of VER's expertise e.g. pharma/ medtech)

6.3. Creation of new institutions with focused mandates

- Setting up an Invest AP Forum (IAF) responsible for proactive sectoral investment promotion on the lines of Karnataka
- Set up a government-owned, privately managed AMC with ₹ 100 crore 'FoF' corpus and VC fund to promote regional startups across priority themes like VR, semiconductors, IoT etc.

6.4. Undertake development of select projects

- End-to-end management including investor identification, land allotment and development support for setting up of CLS in Visakhapatnam
- Set up of 5-10 incubation centres including the Ratan Tata Innovation Centre in Visakhapatnam and Rajahmundry incubating 3,000 startups by FY32
- Conduct annual startup forums and conclaves to help VER emerge as an innovation hub

7. Municipal Administration and Urban Development (MAUD)

MAUD is the nodal department responsible for the planning, development, and civic governance of all urban areas. It oversees all municipal corporations, UDAs and RDAs. Currently, VER has 5 municipal corporations, 1 RDAs and 6 UDAs. MAUD will play a key

role in strengthening these institutions, formulating specific urban development policies and facilitating implementation of key projects under these agencies as outlined in this Economic Master Plan. This will include:

7.1. Facilitating the creation of a new VER Authority

MAUD will need to facilitate the creation of a new unified VER Authority, which will serve as the apex governance body for the region. It would be chaired by the Hon'ble Chief Minister and supported by an Executive Committee.

The new institution would plan and coordinate with all other agencies/ departments in the region such as VMRDA, urban development authorities, municipal corporations, and collectors.

7.2. Expanding mandate of large municipal corporations

Expanding the mandate of municipal corporations (further detailed in section 8 below), enabling them to:

- Take up Economic Master Planning with clear short-term (5 years) and long-term (10 years) investment and talent attraction targets
- Undertake discretionary projects including creation of ALTAs, world-class tourism infrastructure etc.
- Creation of dedicated organisation verticals such as tourism, affordable housing and ease of doing business

7.3. Creating land and urban development related policies

Formulate the following policies in consultation with relevant stakeholders:

- 'Land value capture/Land monetisation policy' incorporating modern principles such as levying of FAR premium and 'Infrastructure Impact Fees' on a per square foot basis
- 'Slum rehabilitation policy' to facilitate redevelopment of 130,000 slum households in VER, in line with the Government of India's 'Housing for all' scheme

8. Greater Visakhapatnam Municipal Corporation

VER has 5 municipal corporations. Their mandate is limited to delivery of obligatory services around public health, sanitation, water supply, infrastructure and record maintenance.

Municipal corporations in VER and their populations are as detailed below:

- Greater Visakhapatnam Municipal Corporation (GVMC) -1.8 million

- Rajamahendravaram Municipal Corporation (RMC) – 500,000
- Srikakulam Municipal Corporation (SMC) - 160,000
- Kakinada Municipal Corporation (KMC) - 320,000
- Vizianagaram Municipal Corporation (VMC) -240,000

To realise the monumental aspiration outlined in this Economic Master Plan, the approach to municipal governance for GVMC will need to change in the following manner:

8.1. Expand GVMC's institutional mandate

GVMC should be mandated to:

- Prepare an Economic Master Plan for the municipality in line with the priorities laid out in this regional plan and incorporate it in their development plans (DP)
- Take up clear annual, five and ten-year investment and talent attraction targets
- Allocate annual budgets towards the creation of ALTAs and worldclass tourism infrastructure, investment attraction and promotion activities
- Create dedicated institutional capacity in the following areas:
  - Economic and spatial planning departments for economic thinking, urban design and ALTA planning
  - Special cells to promote sectors such as tourism
  - Clear and transformative targets and a specific cell for EoDB
  - A dedicated climate resilience and sustainability wing

8.2. Undertake broader spectrum of projects

While municipal corporations will continue to be the nodal agency for projects around water, sanitation and development of other civil amenities, GVMC should also take up select functions like development of recreational zones and housing projects. Few projects include:

- Planned development of Kambalakonda eco-tourism hub including upgradation of the approach road, creation of a large parking facility, creation of well-marked walking trails and other attractions like adventure sports facilities, food court, retail outlet etc.
- Undertake housing projects including cluster redevelopment of 3-4 dense clusters and transit-oriented housing near 4-5 transit stations in urban areas

Central government unlocks

The Government of India needs to play a crucial role in enabling the implementation of the VER Growth Hub aspirations as detailed below:

1. Ministry of Petroleum and Natural Gas, and Ministry of Chemicals and Fertilisers

- Complete the 150-175 km unfinished stretch of the Kakinada-Srikakulam gas pipeline, critical to complete the national gas grid and unlock VER's gas economy
- Attract anchor investors for the petrochemical cracker and downstream chemical complex, proposed near Mulapeta port
- Provide approval for setting up NIPER unit in the proposed life-sciences cluster in Srikakulam

2. Ministry of Commerce and Industry

- Assist in the transfer of 5,500 acres of salt pan lands in Srikakulam to enable development of Mulapeta port and proximate industrial development
- Create a state support framework for seafood re-export operations, which is at par with competitors like Ecuador, China

3. Ministry of Steel

- Support an increase in RINL's capacity utilisation from 60-65% to 80-85% and facilitate expansion of its total capacity from 7.3 to 10-12 MMTPA by FY32. Support in the utilisation of RINL's unutilised land bank for setting up a large downstream steel manufacturing complex
- National Mineral Development Corporation (NMDC) should plan for the expansion of its iron ore production capacity from 35-40 to 80-100 MMTPA at Bailadila mines, to ensure availability of critical raw material to support VER's vision

4. Ministry of Ports, Shipping and Waterways

- Support the expansion of Visakhapatnam port from 134 to 151 MMTPA by FY32, further aided by port modernisation, mechanisation and improved evacuation projects
- Assist in the development of proposed Mulapeta port to enable 100 MMTPA of operational capacity by FY32
- Attract major international shipbuilding players as anchor investors for proposed 0.5 million GT shipbuilding, ship-repair and ancillary manufacturing cluster at Mulapeta

5. Ministry of Railways/ Ministry of Housing and Urban Affairs

- Complete 5 ongoing rail projects by 2027-28 and 7 new railway projects by 2032 to meet incremental rail cargo and improve rail coefficient
- Provide viability funding for the combined phase 1 and 2 of the 77 km Visakhapatnam Metro to be completed by 2028-30
- Approve revised slum rehabilitation policy on central government land, which will align with and leverage MoHUA's 'Housing for all' scheme, to redevelop slum households on GoI land in VER

6. Ministry of Road, Transport and Highways

- Complete 8 ongoing road projects by 2027-28, to improve immediate road connectivity
- Start and complete the 9 new road projects proposed by 2032, to improve hinterland connectivity, port evacuation and regional connectivity between key hubs

7. Ministry of Jal Shakti

- Provide funding and assistance for 20-30% of the proposed water, sewage and wastewater infrastructure, to support VER's quality of living and sustainability aspirations

8. Ministry of Defence, Ministry of Electronics and Information Technology, and Ministry of New and Renewable Energy

- Attract anchor PSU/private sector investors for manufacturing hubs focused on defence, clean technology and electronics and electronic components manufacturing in VER

7 Financing and land requirements

Context

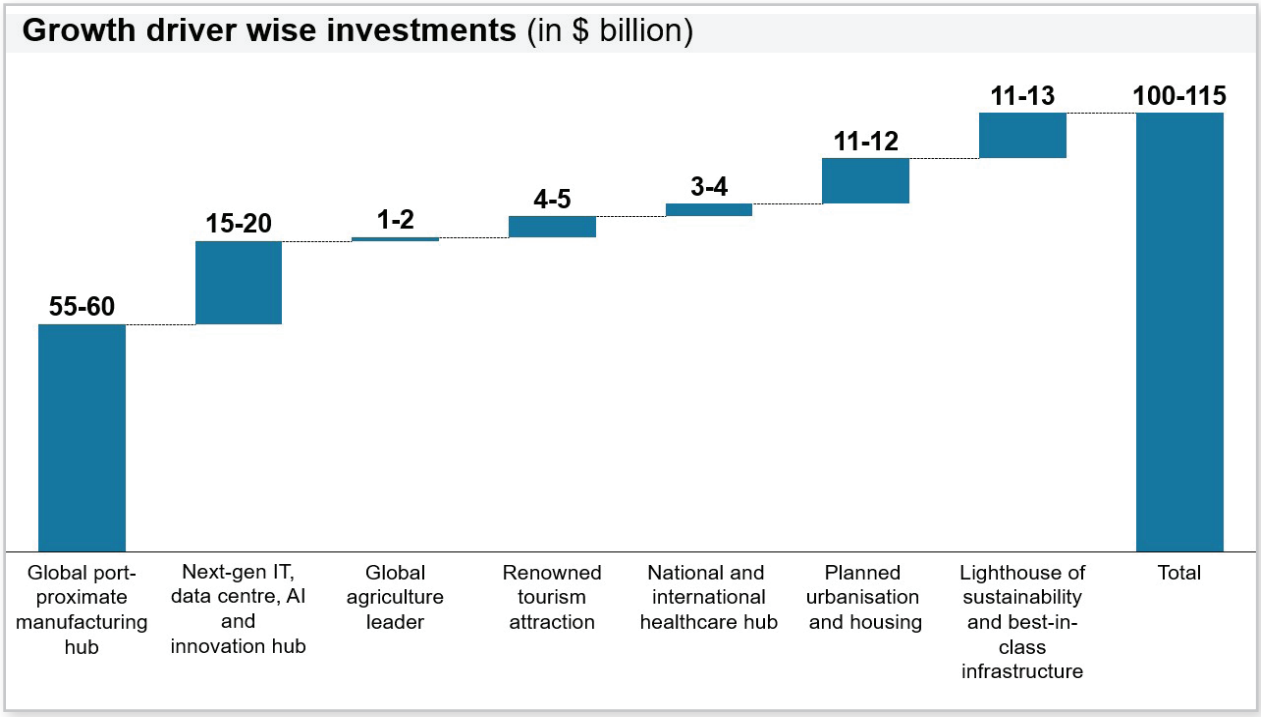
This Economic Master Plan sets a bold ambition to transform VER's GDP from $52 billion (FY23) to $125-$135 billion (FY32). To achieve this, the plan prioritises 65-70 interventions as detailed in the previous chapter including prioritised projects, policy unlocks and institutional changes required. In addition to these interventions, successful implementation of these projects hinges on two core imperatives:

- **Financing:** Mobilisation of $100-$115 billion in investments to fund the prioritised projects
- **Land:** Approximately 50,000-55,000 acres of land is required to enable the economic aspirations set forth in this Economic Master Plan. Of the total requirement, 35,000-40,000 acres of land is already available

Financing requirements

VER will need to attract investments to the tune of $100-115 billion (₹8.5-9.5 lakh crores) across the 7 growth drivers as detailed in Figure 104.

Figure 104: Total investments required in VER by growth driver



Some key drivers of investment include:

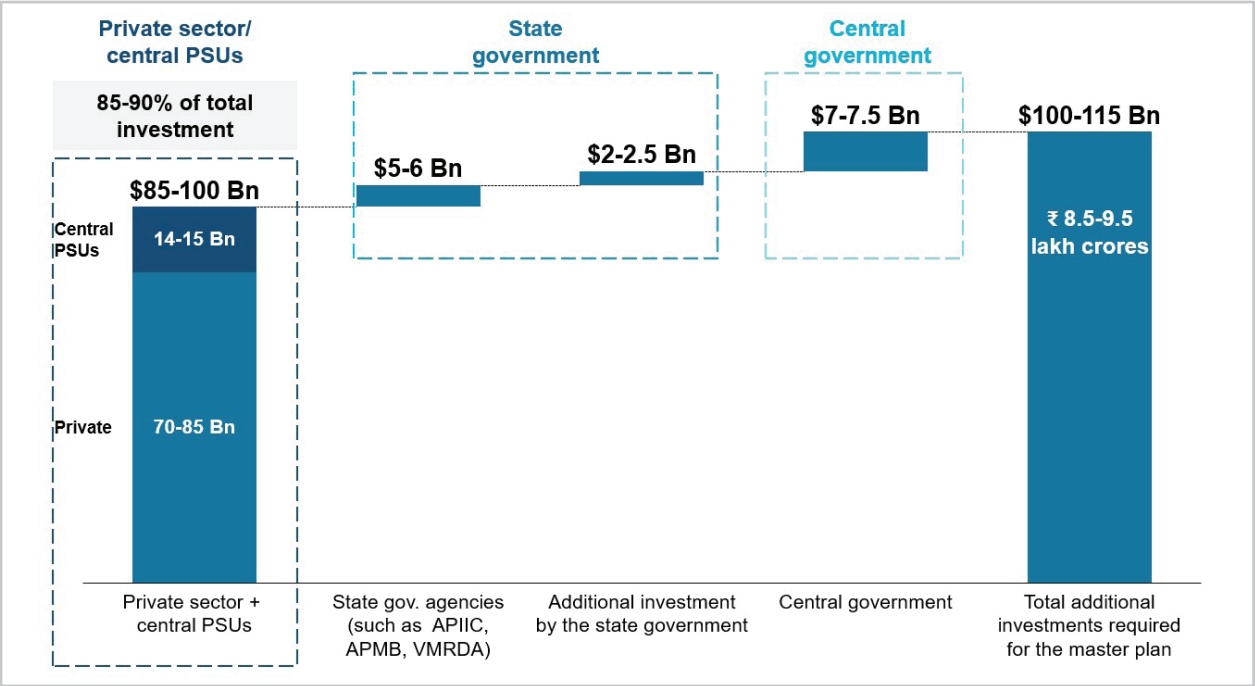
- **Global port-proximate manufacturing hub:** This growth driver is expected to account for more than half of the overall investment required ($55-60 billion) under this Economic Master Plan. In return, this investment is projected to generate $25-30 billion in incremental GVA and create 600,000 - 700,000 new jobs. Select marquee

investments include the greenfield 14-15 MMTPA integrated steel plant (investments of $10-11 billion), the 0.5 MMTPA green hydrogen hub (investments of $10 billion) and the 1.5 MMTPA mixed-feed cracker (investments of $4-5 billion)

- **Next-gen IT, data centre, AI and innovation hub:** To emerge as a leader in the IT, AI, data centre and innovation ecosystem, $15-20 billion worth of investments would be required. The investments would primarily be focused on creating over 40 million square feet of office spaces and at least 2.5 GW of data centre capacity across the proposed greenfield IT and data centre parks. This investment is projected to generate $8-10 billion in incremental GVA and create 400,000 - 425,000 new jobs
- **Global agriculture leader:** For VER to become a global leader in value-added agriculture, $1-2 billion in investments will be required across poultry (eggs), aquaculture, horticulture, nursery and food processing parks. This investment is projected to generate $5-7 billion in incremental GVA and create 100,000 - 125,000 new jobs
- **Renowned tourism attraction:** To emerge as a go-to tourist attraction for both domestic and international tourists across coastal, religious, experiential and MICE tourism, the region will require an infusion of $4-5 billion in investments across key elements such as hotels, convention halls, development of sites and experiences. This investment is projected to generate $4.5-5.5 billion in incremental GVA and create 300,000 - 350,000 new jobs
- **National and international healthcare hub:** To materialise VER's aspirations of becoming a national and international healthcare hub, the region will require $3-4 billion in investments across 15-20 hospitals, senior living residences, wellness resorts, 2 new medical colleges and 10-12 nursing colleges, and other mixed-use related developments. This investment is projected to generate $3-4 billion in incremental GVA and create 100,000 - 150,000 new jobs
- **Planned urbanisation and housing:** VER will require investments of $11-12 billion for the creation of 15+ mixed-used clusters including at least 7 industrial cities, 6 service hubs and 2 brownfield cities. This investment is projected to generate $6-7 billion in incremental GVA and create 200,000 - 300,000 new jobs (majority construction jobs)
- **Lighthouse of sustainability and best-in-class infrastructure:** To become a lighthouse of sustainability and best-in-class connectivity, water and power infrastructure, VER will require investments of $11-13 billion. This investment is projected to generate $4-6 billion in incremental GVA and create 300,000 - 350,000 new jobs (majority construction jobs)

While the private sector will be the primary source of funding, catalytical investment from the state government, state government agencies and the central government will be required to catalyse private infusion and accelerate infrastructure development as shown in Figure 105.

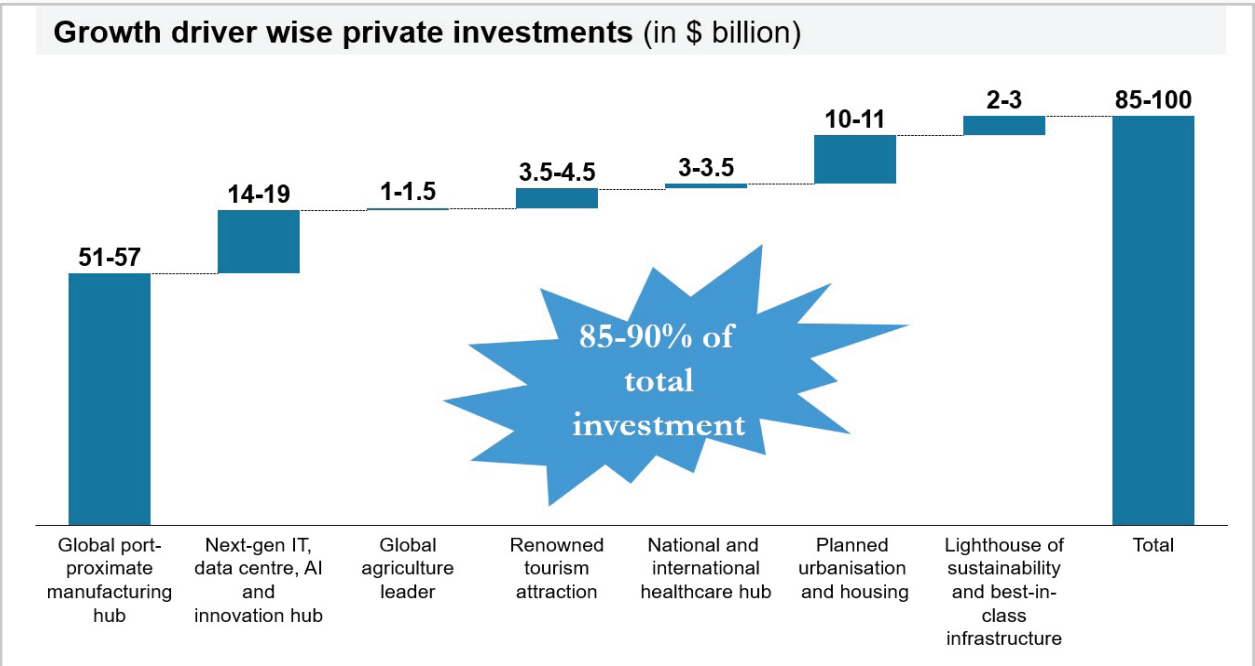
Figure 105: Investments required in VER by funding source (in $ billion)



1. Private sector/ central PSU investments ($85-100 billion)

VER will need to attract $85-100 billion from the private sector as shown in Figure 106. The private sector investment figure also includes capital from the central PSUs such as NTPC, RINL and the Visakhapatnam Port Authority, as these investments are also made on a commercial basis with IRR expectations.

Figure 106: Private investments required in VER



- Of the required private investments, 55-60% will be required in 5 large sub-sectors,

namely 1) steel and downstream steel; 2) petrochemicals, chemicals and gas; 3) clean technology manufacturing; 4) data centres and 5) planned urbanisation and housing

- Further, to facilitate investor attraction, excellent connectivity, water, power and plug-and-play infrastructure will be required along with a robust policy architecture providing attractive incentives for anchor investors (detailed in the chapter 'Projectisation, policies and institutional mandates')
- Interestingly, of the $85-100 billion private and central PSU investments required, $20-25 billion of private investments have been committed. Some marquee investments include:
  - $5.5-6 billion investment for development of ArcelorMittal Nippon Steel's first phase of the 14-15 MMTPA greenfield integrated steel plant at Nakkapalli, with a dedicated 20-25 MMTPA captive port and a slurry pipeline
  - $7.5-8 billion investment for clean-tech projects such as NTPC's 0.5 MMTPA green hydrogen hub at Pudimadaka; a private conglomerate's 1 MMTPA green ammonia and 2 GW electrolyser manufacturing facility in Kakinada
  - $0.5-1 billion investments for phase-1 (23.5 MMTPA) development of greenfield Mulapeta port and the privately developed 16 MMTPA Kakinada Gateway port
  - $7-10 billion of investments in Visakhapatnam for the development of IT and data centre hubs by marquee global players. Interestingly, Google has already committed to establish its first India based AI hub in Visakhapatnam

2. State government agencies ($5-6 billion)

State government agencies will need to infuse $5-6 billion of catalytic investments (mostly NPV positive investments in land and infrastructure):

- A major part of the state government investments will need to come from agencies such as APIIC, VMRDA, APMB, and power utilities
- These will predominantly be NPV positive investments for land and infrastructure development and, if managed correctly, could have an IRR of over 15%, achieved through a combination of land sales, FAR monetisation and infrastructure fees
- While the initial investments will come from the agency's balance sheets as well as debt raising, strategic land monetisation will play a critical role in making them self-sustaining. Several successful examples of land monetisation for economic growth exist, including those of MMRDA and CIDCO in Maharashtra. VER's state government agencies can follow suit and utilise such a strategy of land monetisation to yield NPV positive investments for acquisition of land and development of trunk infrastructure

Based on our analysis, we have identified select state government agencies that are well placed to make these investments. However, the list is suggestive and the project allocations can change depending on the state government's inputs, future synergies and commercial requirements:

1. **Andhra Pradesh Industrial Infrastructure Corporation (APIIC):** APIIC will need to invest $2.5-3 billion. These investments will act as the springboard for the creation of 12-15 manufacturing nodes and 3 services hubs. Capital will primarily be used for the following three purposes:
    - To secure additional 10,000-13,000 acres of land for manufacturing and 1,000+ acres of land for service hubs
    - Infrastructure development of the sites with essential trunk utilities like roads, water, and sewage across the industrial cities and service hubs
    - Undertaking end-to-end development of select marquee projects as nodal agency including development of 2,000 acres downstream steel hub, creation of 600 acres of plug-and-play sheds for labour-intensive manufacturing
2. **Andhra Pradesh Maritime Board (APMB):** APMB will need to invest $1-1.5 billion for acquisition of 4,000-5,000 acres of additional land and creation of last-mile and trunk infrastructure for the new Mulapeta port. APMB will also have to facilitate acquisition of 1,000 acres of land and trunk infrastructure for the proposed 0.5 million GT shipbuilding cluster
3. **Visakhapatnam Metropolitan Region Development Authority (VMRDA):** VMRDA's $1 billion investment will be required for the development of various service hubs and cities (including an IT park; Vizag Bay City, Kailasagiri, Thotlakonda and national and international healthcare hub); at least 3 TOD hubs; and 10,000 units of affordable housing amongst others
4. **State power utilities such as the DISCOM and TRANSCO:** $0.5-0.6 billion of investments will be required as the state's contribution (30-40%) in the creation of last-mile distribution and transmission infrastructure with the balance facilitated through TBCB and central schemes/grants such as RDSS
5. **Other agencies:** This includes $0.2 billion of investments that will be split across various other agencies such as the Andhra Pradesh State Housing Corporation Limited (APSHCL), Andhra Pradesh Tourism Development Corporation (APTDC) that might undertake other projects. These investments will be required for focused tourism sub-projects, cluster redevelopment and development of urban amenities and affordable housing

3. Government of Andhra Pradesh ($2-2.5 billion)

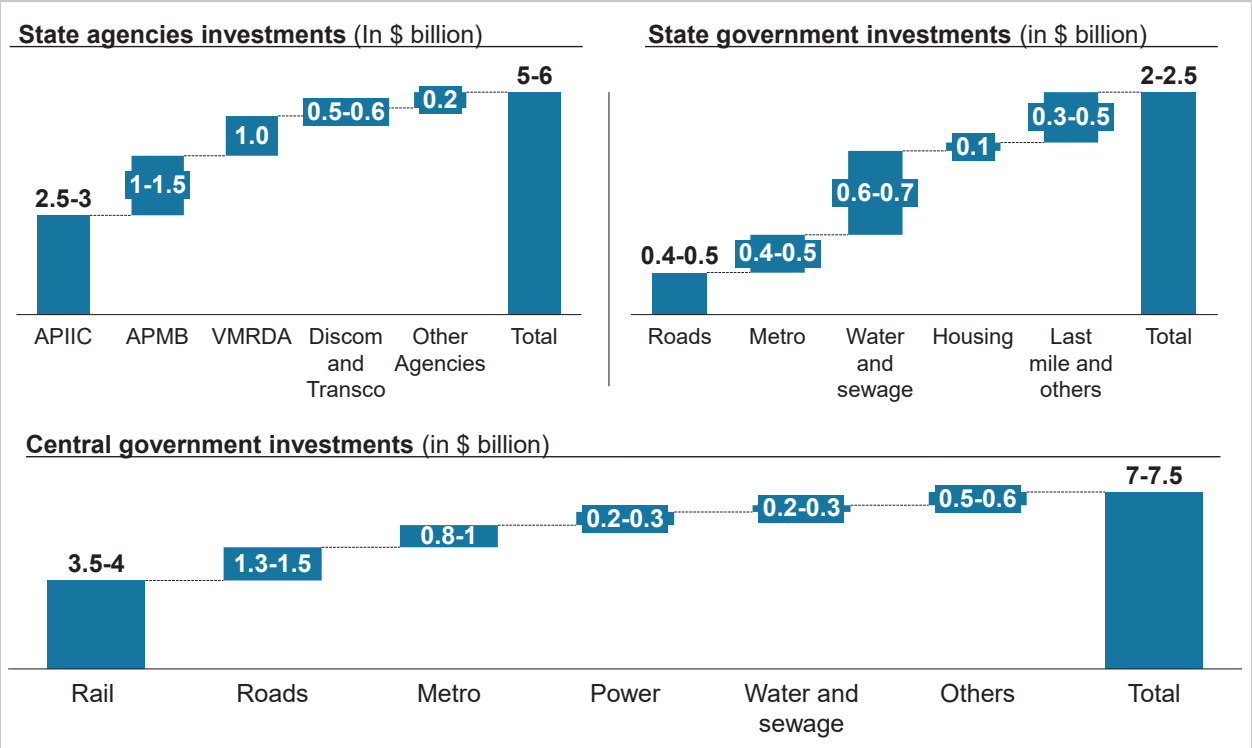
The state government will need to directly facilitate an additional $2-2.5 billion of investments to bridge the gap in crucial areas including:

- **Road infrastructure ($0.4-0.5 billion):** These investments include the state government's share in national highway and state highway projects, including the 4-lane elevated corridor and Rambilli-Bhogapuram semi-ring road
- **Metro ($0.4-0.5 billion):** The state is expected to fund 20-30% of the proposed 77 km

phase 1 and 2 Visakhapatnam Metro, in conjunction with the central government and development financing institutions

- **Water & sewage infrastructure ($0.6-0.7 billion):** These investments include 65-70% of the total investments required to facilitate water, sewage and wastewater infrastructure in the region, with the rest coming from central government schemes such as AMRUT 2.0 and the Urban Infrastructure Development Fund
- **Housing, last mile and other investments ($0.4-0.6 billion):** These include investments in select tourism projects (such as the Araku experiential tourism hub, Lotus Trail Buddhist Circuit) as well as last mile and other infrastructure projects. These investments also include the state government's share of subsidy contribution towards PMAY-U for affordable housing development

Figure 107: State agencies, state and central government investments required



4. Government of India ($7-7.5 billion)

Lastly, the central government will need to provide vital support of $7-7.5 billion in investments, 75-80% of which will be towards the centre's share/ gap funding for new rail, road and metro infrastructure projects. These include:

- $3.5-4 billion investments for new rail projects
- $1.3-1.5 billion in investments for new road projects
- $0.8-1 billion in gap funding for the development of the 77 km Visakhapatnam Metro
- $1-1.2 billion in central support in last mile power, water and sewage infrastructure as well as subsidies towards agriculture and affordable housing from schemes such

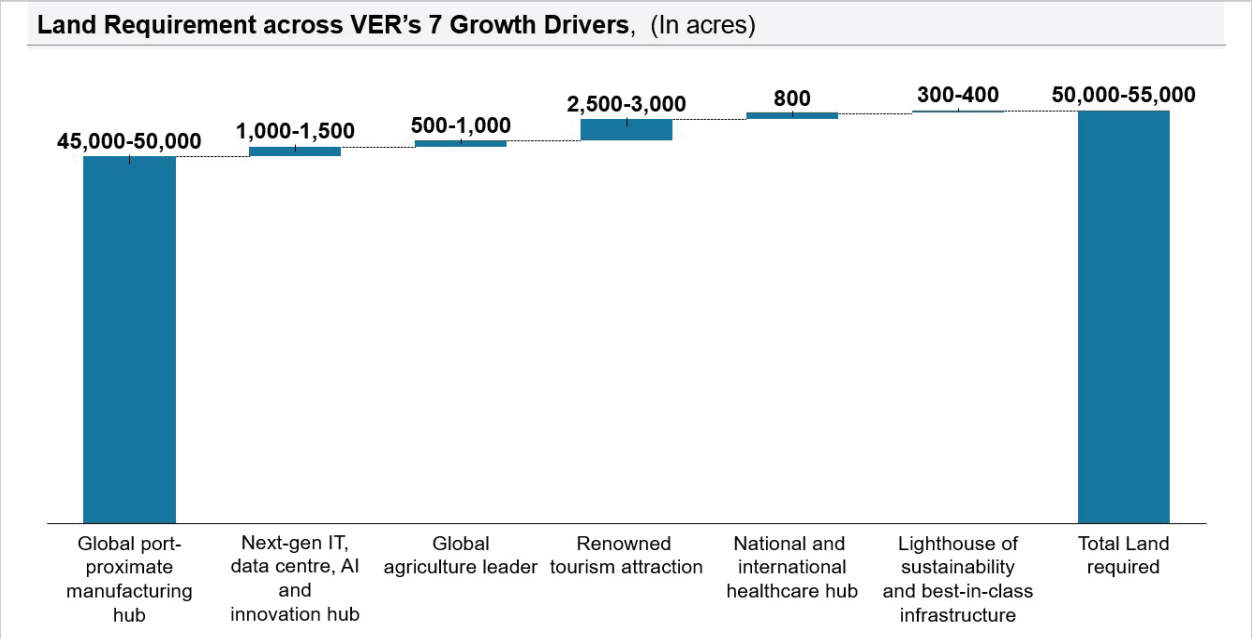
as AMRUT 2.0, Urban Challenge Fund and Urban Infrastructure Development Fund amongst others. These investments also include $0.2-0.3 billion of central government's share of subsidies in PMAY-U for developing 120,000 affordable housing units

Land requirements

The successful implementation of the projects prioritised as part of this Economic Master Plan, will require a total land footprint of 50,000-55,000 acres.

The land requirements across each growth driver, are detailed in Figure 108.

Figure 108: Land requirement across VER's 7 growth drivers



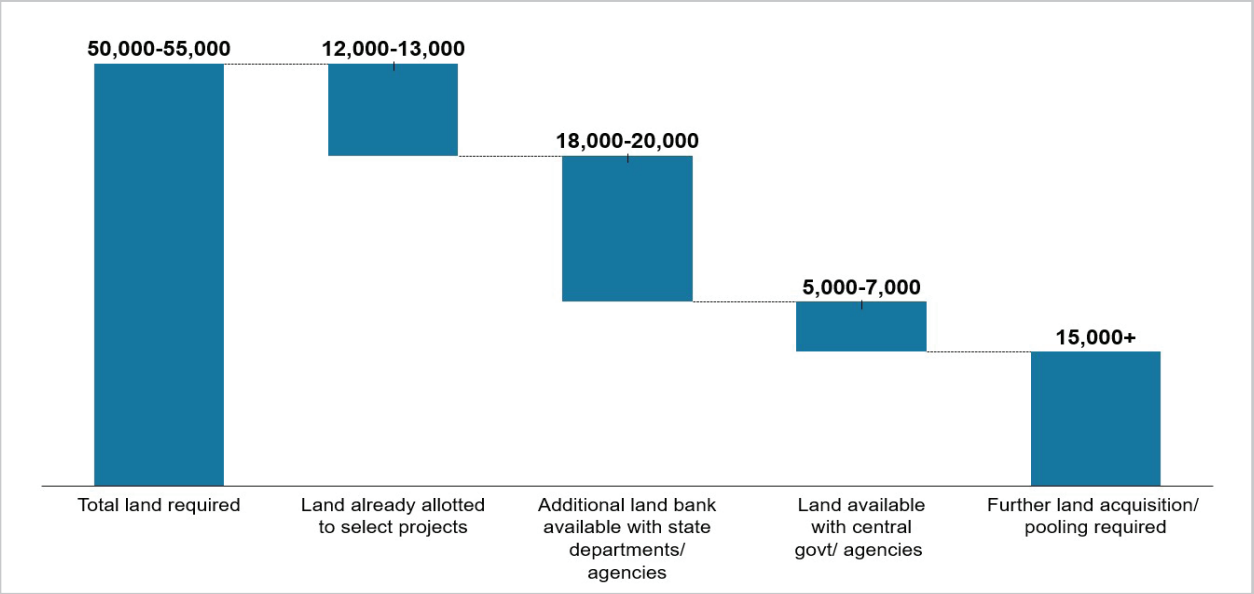
The good news is that 35,000-40,000 acres of land required is already available. Of this, 12,000-13,000 acres of land has already been allotted to the investors for select anchor projects, including 2,200 acres for the new greenfield 14-15 MMTPA integrated steel plant in Nakkapalli, 2,000 acres for the bulk drug park in Nakkapalli, 1,200 acres for the 0.5 MMTPA green hydrogen hub in Pudimadaka, 5,600 acres for the private multi-product park in Kakinada and 1,650 acres for the greenfield Kakinada Gateway Port.

Further, approximately 23,000-27,000 acres of land across VER is readily available across different state and central government agencies and departments as detailed below:

- **State agencies and departments:** The Andhra Pradesh Industrial Infrastructure Corporation (APIIC) has 10,000-12,000 acres of land available in the region. This is complemented by approximately 8,000 acres of land available with other state agencies and departments including the Andhra Pradesh Maritime Board (APMB), the Andhra Pradesh Tourism Development Corporation (APTDC), the Visakhapatnam Metropolitan Region Development Authority (VMRDA) and revenue department

- **Central government departments and agencies:** An estimated 5,000-7,000 acres of land is also available with central government departments and agencies, including approximately 5,500 acres of salt pan land in the Srikakulam district under the Ministry of Commerce and Industry

Figure 109: Existing land bank and further acquisition required



Banking on this land availability, the state government and agencies will have to additionally notify and acquire over 15,000 acres of land in VER. This will be crucial towards replenishing the land bank for flexible use across the projects identified in this master plan.

Given its established mandate, financial capabilities and rich experience in land acquisition and development, the Andhra Pradesh Industrial Infrastructure Corporation (APIIC) and the Visakhapatnam Metropolitan Region Development Authority (VMRDA) could serve as the nodal agencies for this large-scale land acquisition and development initiative. While acquiring the full land parcel of 50,000-55,000 acres would have required a substantial financial outlay, the availability of the 35,000-40,000 acres of land reduces the investment for additional acquisition to $1-1.5 billion.

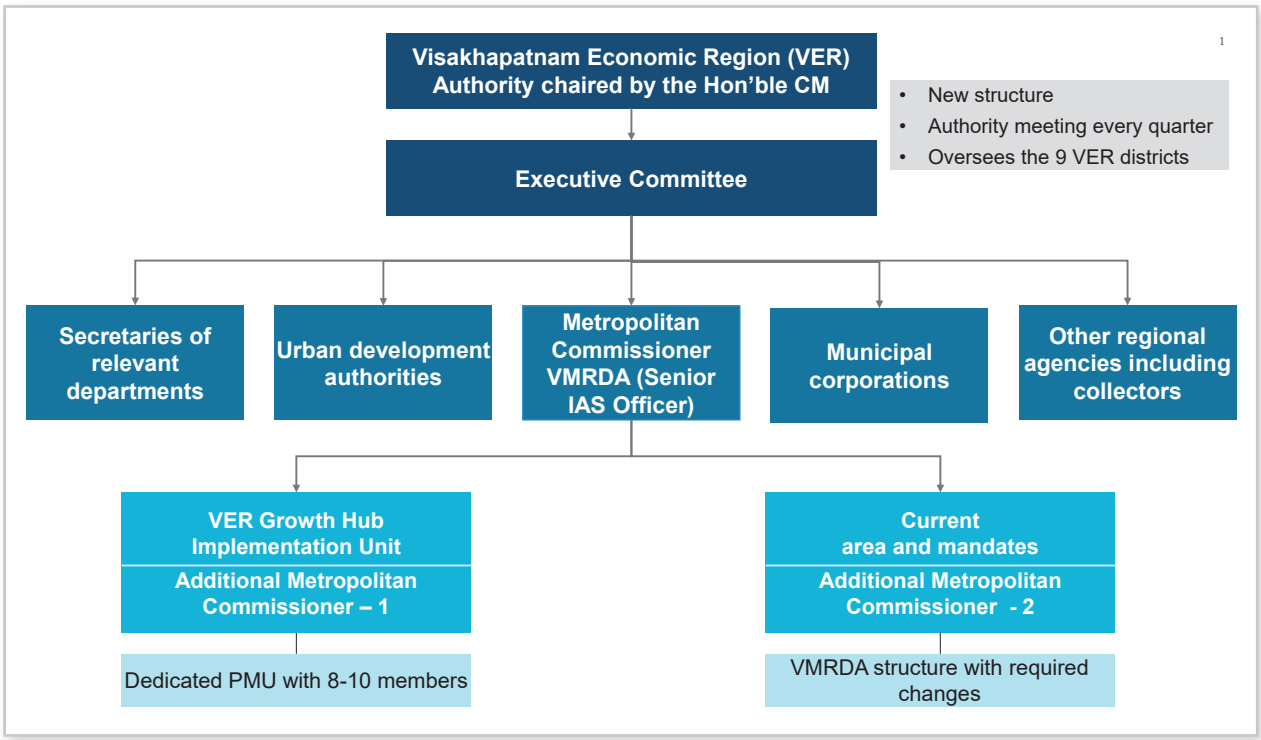
8 Implementation architecture and next steps

To ensure timely and coordinated execution of the VER Economic Master Plan, a robust governance and implementation architecture should be established and should include:

- **A new unified Visakhapatnam Economic Region Authority:**
  - A new unified VER Authority, chaired by the Hon'ble Chief Minister and supported by an Executive Committee, should be created as the apex governance body
  - The authority should be created on the lines of the Andhra Pradesh Capital Region Development Authority (APCRDA)
  - State ministers and secretaries should be appointed as Members of the Authority and the Executive Committee
  - The institution should plan and coordinate with VMRDA, urban development authorities, municipal corporations, collectors, and other relevant agencies in the region
  - The Authority should meet every quarter to take critical decisions and debottleneck projects as required. This should be supplemented by monthly Executive Committee meetings to facilitate inter-departmental coordination

- **Creation of 8-10 member dedicated Program Monitoring Unit (PMU):** Establish a G-Hub Program Monitoring Unit (PMU) with 8-10 full-time people, housed within Visakhapatnam Metropolitan Region Developmental Authority (VMRDA). The PMU would be responsible for conducting weekly reviews to maintain program momentum and provide timely issue resolution

Figure 110: Proposed architecture for G-hub implementation



After the governance architecture is approved, seven key interventions are required over the next six months to help mobilise this Economic Master Plan and lay a solid foundation for sustainable growth and development of region over the next 5-7 years:

- Appointing senior secretary-level nodal officers for each of the seven growth drivers for preparing and implementing detailed action plans (Figure 111)
- Creating a quarterly monitoring architecture with the NITI Aayog to support coordination and project management at the central level, especially for projects requiring central government involvement
- Strengthening VMRDA by appointing a Senior IAS officer as Metropolitan Commissioner and establishing a dedicated Growth Hub PMU with 8-10 members to drive VER implementation, headed by an Additional Metropolitan Commissioner
- Creating and notifying 6 new economic policies and amending 3 economic policies
- Strengthening the 8 key institutions identified by implementing the changes proposed
- Selecting and notifying the nodal agencies for the implementation of each of the 65-70 prioritised interventions
- Starting acquisition for over 15,000 acres of additional land required for the projects prioritised in this Economic Master Plan

Figure 111: Growth drivers and respective nodal departments

Growth driver	Nodal department
Global port proximate manufacturing hub	Department of Industries and Commerce
Next-Gen IT, data centre and innovation hub	Information Technology, Electronics & Communications Department
Global agriculture leader	Department of Agriculture, Department of Animal Husbandry and Fisheries
Renowned tourism attractions	Department of Tourism
National and international healthcare hub	Department of Health, Medical and Family Welfare
Planned urbanisation and housing	Municipal Administration & Urban Development Department
Lighthouse of sustainability and best-in-class Infrastructure	Department of Infrastructure and investment, Department of Industries and Commerce

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AI	Artificial Intelligence
AI/ML	Artificial Intelligence / Machine Learning
AIESL	Air India Engineering Services Limited
ALTA	Amenities for Liveability and Talent Attraction
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AMTZ	Andhra MedTech Zone
AP	Andhra Pradesh
APEDA	Agricultural & Processed Food Products Export Development Authority
APEDB	Andhra Pradesh Economic Development Board
APEPDCL	Andhra Pradesh Eastern Power Distribution Company Limited
APSHCL	Andhra Pradesh State Housing Corporation Limited
API	Active Pharmaceutical Ingredient
APIIC	Andhra Pradesh Industrial Infrastructure Corporation
APMB	Andhra Pradesh Maritime Board
APSADA	Andhra Pradesh State Aquaculture Development Authority
APTDC	Andhra Pradesh Tourism Development Corporation
AR/VR	Augmented Reality / Virtual Reality
ASEAN	Association of South East Asian Nations
ASI	Archaeological Survey of India
ASR	Alluri Sitharama Raju (district)
AUM	Assets Under Management
AYUSH	Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy
BAHS	Basic Animal Husbandry Status
BITS	Birla Institute of Technology and Science
BKC	Bandra Kurla Complex
BMC	Broodstock Multiplication Centres
BOD	Biochemical Oxygen Demand
BPM	Business Process Management
BPT3	Cashew Variety
BPT9	Cashew Variety
BSLC	Bharat Steel Logistics Cluster (context-specific)
BUDA	Bhogapuram Urban Development Authority

C&D	Construction and Demolition
C2	Ethylene
C3	Propylene
C4	Butadiene
C6	Benzene
C8	paraxylene
CAA	Coastal Aquaculture Authority
CAGR	Compound Annual Growth Rate
CBG	Compressed Biogas
CEO	Chief Executive Officer
CESL	Convergence Energy Services Limited
CIDCO	City and Industrial Development Corporation
CII	Confederation of Indian Industry
CLS	Cable Landing Station
CM	Chief Minister
CMFRI	Central Marine Fisheries Research Institute
CNG	Compressed Natural Gas
COE	Centres of Excellence
CPCB	Central Pollution Control Board
CPO	Crude Palm Oil
CRISIL	Credit Rating Information Services of India Limited
CRZ	Coastal Regulation Zone
CTE	Consent to Establish
CTO	Consent to Operate
DC	District Collector
DDP	District Domestic Product
DES	Directorate of Economics and Statistics
DHCC	Dubai Health Care City
DIMTS	Delhi Integrated Multi Modal Transit System
DISCOM	Distribution Company
DMF	District Mineral Foundation
DPIIT	Department for Promotion of Industry and Internal Trade
DPR	Detailed Project Report
DRDO	Defence Research and Development Organisation

DWT	Deadweight Tonnage (shipping)
EDB	Economic Development Board
EIL	Engineers India Limited
EoDB	Ease of Doing Business
EPA	Environment Protection Act
ER&D	Engineering Research & Development
EU	European Union
EV	Electric Vehicle
F&B	Food and Beverage
FAO	Food and Agriculture Organization
FAR	Floor Area Ratio
FCI	Food Corporation of India
FCR	Feed Conversion Ratio
FDI	Foreign Direct Investment
FFB	Fresh Fruit Bunch
FICCI	Federation of Indian Chambers of Commerce and Industry
FMC	Forward Markets Commission
FSI	Floor Space Index
FY	Financial Year
G9	Banana Variety
GAIL	Gas Authority of India Limited
GCC	Global Capability Centre
GDDP	Gross District Domestic Product
GDP	Gross Domestic Product
GI	Geographical Indication
GIFT	Gujarat International Finance Tec-City
GoI	Government of India
GSDP	Gross State Domestic Product
GSFT	Global Forum for Sustainable Transformation
GSVA	Gross State Value Added
GT	Gross Tonnage
GTRI	Global Trade Research Initiative
GVA	Gross Value Added
GVMC	Greater Visakhapatnam Municipal Corporation

GW	Gigawatt
H5N1	Avain influenza
HCL	Hindustan Computers Limited
HOHO	Hop-On Hop-Off (tourism buses)
HPCL	Hindustan Petroleum Corporation Limited
HSL	Hindustan Shipyard Limited
IAF	Indian Air Force
IBEF	India Brand Equity Foundation
ICAR-CARI	Indian Council of Agricultural Research - Central Avian Research Institute
IEA	International Energy Agency
IIM	Indian Institute of Management
IIT	Indian Institute of Technology
IMARC	International Market Analysis Research & Consulting
IMC	Indian Merchants Chamber
IMTA	Integrated Multi-Trophic Aquaculture
INM	Integrated Nutrition Management
INR/ ₹	Indian Rupee
IPM	Integrated Pest Management
IQF	Individual Quick Freezing
IRR	Internal Rate of Return
ISB	Indian School of Business
ISEG	Institute for Sustainability, Employment and Growth
IT	Information Technology
IT/BPM	Information Technology / Business Process Management
ITDA	Integrated Tribal Development Agency
ITE&C	Information Technology, Electronics & Communications
JCI	Joint Commission International
JICA	Japan International Cooperation Agency
JNI	Jindal Naturecure Institute
JNPA	Jawaharlal Nehru Port Authority
KAMCO	Karnataka Asset Management Company
KAUDA	Kakinada Urban Development Authority
KG	Krishna-Godavari (Basin)
KITVEN	Karnataka Information Technology Venture Capital Fund

KMC	Kakinada Municipal Corporation
KSC New Town	Karnala-Sai-Chirner New Town
KSPL	Kakinada SEZ Port Limited
KUDA	Kakinada Urban Development Authority
Konaseema	Dr. B.R. Ambedkar Konaseema
LEAF	AP Leather and Footwear Policy
LFPR	Labour Force Participation Rate
LIG	Low Income Group
LNG	Liquefied Natural Gas
LPCD	Litres Per Capita per Day
LT-HT	Low Tension – High Tension (power lines)
Manyam	Parvathipuram Manyam
MAUD	Municipal Administration & Urban Development
MAKV	Maritime Amrit Kaal Vision
MEG	Mono-Ethylene Glycol (chemical)
MF	Microfiltration
MICE	Meetings, Incentives, Conferences, Exhibitions
MIV	Maritime India Vision
ML	Machine Learning
MLD	Million Litres per Day
MMLP	Multi-Modal Logistics Park
MMRDA	Mumbai Metropolitan Region Development Authority
MMSCMD	Million Metric Standard Cubic Metres per Day
MMTPA	Million Metric Tonne Per Annum
MOFPI	Ministry of Food Processing Industries
MOSPI	Ministry of Statistics and Programme Implementation
MOU	Memorandum of Understanding
MPEDA	Marine Products Export Development Authority
MRI	Magnetic Resonance Imaging
MRO	Maintenance, Repair & Overhaul
MSME	Micro, Small and Medium Enterprises
MSW	Municipal Solid Waste
MT	Metric Tonne
MVA	MegaVolt-Ampere

MW	Megawatt
NAINA	Navi Mumbai Airport Influence Notified Area
NASSCOM	National Association of Software and Service Companies
NBC	Nucleus Breeding Centre
NCA	National Coffee Association
NCR	National Capital Region
NE-SW	North-East South-West
NHAI	National Highways Authority of India
NIN	National Institute of Nutrition
NIPER	National Institute of Pharmaceutical Education and Research
NIT	National Institute of Technology
NMDC	National Mineral Development Corporation
NPK	Nitrogen Phosphorus Potassium
NPR	National Rail Plan
NPV	Net Present Value
NSS	National Sample Survey
NSVA	Net State Value Added
NTDA	New Town Development Authority
NTPC	National Thermal Power Corporation
NTT	Nippon Telegraph and Telephone (Japan)
ODOP	One District One Product
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
OER	Oil Extraction Ratios
OMDC	Orissa Minerals Development Company
ONGC	Oil and Natural Gas Corporation
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PCBA	Pollution Control Board of Andhra Pradesh
PCPIR	Petroleum, Chemicals and Petrochemicals Investment Region
PIB	Press Information Bureau, Government of India
PM	Prime Minister
PMAY	Pradhan Mantri Awas Yojana
PMAY-U	Pradhan Mantri Awas Yojana-Urban
PMSSY	Pradhan Mantri Matsya Sampada Yojana

PMU	Program Monitoring Unit
PNGRB	Petroleum and Natural Gas Regulatory Board
PPP	Private-Public Partnership
PSU	Public Sector Undertaking
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance / Quality Control
R&D	Research & Development
RDSS	Revamped Distribution Sector Scheme
RE	Renewable Energy
REMZ	Renewable Energy Manufacturing Zones
RINL	Rashtriya Ispat Nigam Limited (Vizag Steel Plant)
RK Beach	Ramakrishna Beach
RMC	Ready Mix Concrete
ROW	Right of Way
RPA	Robotic Process Automation
SAF	Sustainable Aviation Fuel
SGST	State Goods and Services Tax
SH	State Highway
SMC	Srikakulam Municipal Corporation
SMT	Surface Mount Technology
SPA	Special Planning Authority
SPS	State Planning Secretariat
SRM	Sri Ramaswamy Memorial Institute of Science and Technology
SSAP	State Specific Action Plan
SUDA	Srikakulam Urban Development Authority
TBCB	Tariff-Based Competitive Bidding
TCS	Tata Consultancy Services
TDR	Transferable Development Rights
TOD	Transit Oriented Development
TPD	Tonnes Per Day
TRANSCO	Transmission Corporation Andhra Pradesh
TSA	Technical Service Agreement
UDA	Urban Development Authority
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development

UNFPA	United Nations Population Fund
UPVC	Unplasticized Polyvinyl Chloride
USA/US	United States of America
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VCTS	Vessel Communication and Tracking Systems
VER	Visakhapatnam Economic Region
VICT	Vizag International Cruise Terminal
VK-PCPIR UDA	Visakhapatnam Kakinada Petroleum, Chemical and Petrochemical Investment Region Urban Development Authority
VMC	Vizianagaram Municipal Corporation
VMRDA	Visakhapatnam Metropolitan Region Development Authority
VTZ/VOVZ	Visakhapatnam Airport
WEF	World Economic Forum
WHO	World Health Organization
WRI	World Resources Institute
WTE	Waste-to-Energy
XLRI	Xavier School of Management

REFERENCES

1 Government of Andhra Pradesh, Planning Department, GDP Data, FY24 FRE, October 2025
2 Government of Andhra Pradesh, Directorate of Economics and Statistics, October 2025
3 Estimated based on population projections and LFPR
4 GoI Press Information Bureau, India's Steel Industry: Story of Growth and Global Leadership, October 2024
5 McKinsey & Company, Evolving with steel: Future growth and opportunities, September 2024
6 Ministry of Steel, Note on Rashtriya Ispat Nigam Limited
7 Ministry of Ports, Shipping & Waterways and Indian Ports Association, Final Report for Sagarmala (Vol. III), November 2016
8 McKinsey & Company, India: The next chemicals manufacturing hub, March 2023; Press Information Bureau, India's Petrochemical Potential, October 2024
9 Ministry of Chemicals & Fertilizers, Chemical and petrochemical statistics at a glance, 2024
10 Ministry of Chemicals & Fertilizers, EY, FICCI, Catalyzing India's chemicals and petrochemicals: Strategies for global integration and growth, October 2024; Singapore Economic Development Board, Jurong Island: In search of a new miracle; ExxonMobil, ExxonMobil Singapore integrated manufacturing complex brochure; Shell energy and chemicals park Singapore website
11 Ministry of Petroleum and Natural Gas, Indian Petroleum & Natural Gas Statistics 2023-24; NITI Aayog India Climate & Energy Dashboard
12 Petroleum and Natural Gas Regulatory Board, India's Natural Gas Demand Projection for 2030-2040
13 Petroleum and Natural Gas Regulatory Board, Public Notice, January 2024
14 United Nations Conference on Trade and Development (UNCTAD), Review of Maritime Transport 2024: Navigating Maritime Chokepoints
15 Ministry of Ports, Shipping & Waterways, Maritime Amrit Kaal Vision 2047, October 2023
16 Ministry of Ports, Shipping and Waterways, Basic Port Statistics of India, 2022-23
17 Bain & Company, Healing the World: A Roadmap for Making India a Global Pharma Exports Hub, 2025; Ernst & Young, Viksit Bharat@2047: Transforming India from pharmacy of the world to pharma powerhouse for the world, December 2024
18 Foundation for MSME Clusters, Boosting the Indian Medical Devices Industry; 2023; Ernst & Young, India's MedTech industry: The renaissance of a sector, November 2024
19 International Energy Agency, Energy Technology Perspectives 2024;Global market for key clean technologies set to triple to more than $2 trillion over the coming decade as energy transitions advance, October 2024
20 Ministry of new and renewable energy (MNRE), India Achieves Historic Milestone of 100 GW Solar Power Capacity, February 2025
21 CRISIL, Strategic assessment of power and renewable energy sector in India, June 2024; CII, Global champions for advancing renewable energy innovation and manufacturing
22 MNRE, India to Lead the World in Green Hydrogen: Union Minister Shri Pralhad Joshi, March 2025
23 AP Integrated Clean Energy policy 4.0 (2024-29)
24 Greenko Press Release, Uniper and Greenko signed exclusivity for Green Ammonia offtake to EU from India's first Green Ammonia Project in Kakinada, February 2023
25 UNCTAD, Ships built by country of building annual, June 2025
26 Ministry of Ports, Shipping and Waterways, Statistics of India's Ship Building and Ship Repairing Industry 2023-24
27 India Maritime Amrit Kaal Vision 2047 (MAKV 2047), Status of Ship building, Ship Repair and Ship breaking industries in the Country
28 Ministry of Ports, Shipping and Waterways, Shipping Ministry sets goal to complete 150 projects by Sept 2025, March 2025
29 Maritime India Vision 2030, Statistics of India's ship building and ship repairing industry, 2023-24
30 Ministry of Defence, Marching Towards Atmanirbharta: India's Defence Revolution, October 2024
31 NITI Aayog, Electronics: Powering India's Participation in Global Value Chains, July 2024; EY & CII, Vision 2030: India's rise as a global force in consumer electronics and durables June 2024; India Cellular & Electronics Association, $300 BN Sustainable Electronics Manufacturing & Exports by 2026 Roadmap and Strategies; CII, Developing India as the Manufacturing Hub for Electronics Components and Sub-Assemblies, 2024

32 AP Electronics Manufacturing Policy 4.0 (2024-29)
33 Invest India, Leather and footwear in India stitching new India's growth story
34 Invest India, Non-leather footwear industry in India; Ministry of MSME, White paper – Footwear Industry in India; October 2020; Global Trade Research Initiative, India's Footwear Revolution, January 2024
35 Ministry of Commerce & Industry, Quality control orders to curb imports of substandard footwear, save domestic industry from unfair competition, August 2024
36 FICCI-KPMG, State of play: India's toy story- Unboxing fun and beyond, September 2021; AEQUS, Making Headway: Toy Manufacturing Sector in India, September 2021; CII, Whitepaper on India's toys export opportunity
37 Ministry of Statistics and Program Implementation, Annual Survey of Industries, 2023
38 BCG, Six ways to fix aluminium's supply shortage, November 2024
39 Ministry of Mines, Record production in mining in FY 2024-25, May 2025
40 NITI Aayog, India climate and energy dashboard
41 Ministry of Mines, Indian minerals yearbook, 2023
42 US geological survey reports, Chemical statistics at a glance, 2024
43 Press Release by secretary, union ministry of mines, Time to take a decisive step in rare earth minerals exploration, May 2023
44 NASSCOM, Technology sector in India: Strategic review, 2024
45 NASSCOM, Technology sector in India: Strategic review, 2022
46 MeITY, Estimation and measurement of India's digital economy, January 2025
47 IBEF, India's service exports reached a new high of US$ 341.1 billion in FY24, September 2025
48 NASSCOM, Why Global Enterprises Are Doubling Down on India for Engineering the Future
49 Ministry of Electronics & IT, India's AI Revolution, March 2025
50 McKinsey & Company, Technology Trends Outlook 2025, July 2025
51 McKinsey Global Institute, The next big arenas of competition, October 2024
52 McKinsey Global Institute, Generative AI and the future of work in America, 2023
53 McKinsey & Company, The cost of compute: A $7 trillion race to scale data centres, April 2025
54 BCG, Breaking barriers to data centre growth, January 2025
55 World Economic Forum, Global risks report, 2025
56 PWC: Global digital trusts insights, 2025
57 McKinsey & Company, Unlocking the industrial potential of robotics and automation, 2022
58 World Economic Forum, Future of Jobs Report, 2025
59 PWC, The Fearless Future: 2025 Global AI Jobs Barometer, 2025
60 McKinsey & Company, A new future of work: The race to deploy AI and raise skills in Europe and beyond, May 2024
61 NASSCOM, Deloitte, Emerging technology hubs of India, August 2023
62 Ministry of Electronics & IT, India's IT Industry Registers Significant Growth in Last Decade: Projected to Reach $283 Billion in 2024-25, March 2025
63 Government of Andhra Pradesh, Data submitted by Andhra Pradesh Industrial Infrastructure Corporation (APIIC), Industries and Commerce Department
64 McKinsey & Company, The cost of compute: A $7 trillion race to scale data centers, April 2025
65 Jefferies, Powering data centers, June 2024
66 KPMG, Exploring India's dynamic startup ecosystem, December,2024
67 Zinnov, 8 reasons why global GCCs set up global capability centers (GCCS) in India, March 2025
68 Government of Andhra Pradesh, Directorate of Economics and Statistics
69 MOSPI, GSVA/NSVA by economic activities, 2023
70 Food and Agriculture Organisation, World Food and Agriculture-Statistical Yearbook, 2023
71 Government of Andhra Pradesh, AP Socio Economic Survey, 2024
72 Government of Andhra Pradesh, AP Socio Economic Survey, 2023
73 Observatory of Economic Complexity, Egg exports, 2023
74 Poultry India, Shaping the future of Indian Poultry sector, 16th edition, 2024
75 Food and Agriculture Organization of the United Nations, The state of World Fisheries and Aquaculture, 2024
76 Department of Fisheries, Government of India, Handbook of Fisheries, 2022

77 Government of Andhra Pradesh, Department of Fisheries
78 Government of Andhra Pradesh, GSFT aquaculture conference, 2024
79 Network of Aquaculture Centres in Asia-Pacific, Status of Reservoir Fisheries in 5 Asian Countries
80 Shrimp Insights, SyAqua Continues to Grow Indian Broodstock Market Share Amidst Contraction of Total Broodstock Supply, January 2025
81 Shrimp Insights, China's Shrimp Imports Hit 2025 High in May, Up 5% YoY and Second-Highest May on Record, June 2025
82 Commercial Seaweed Market Size, Share, Trends Report, 2022
83 State of world fisheries and aquaculture report, 2024
84 India Water Portal, India's Seaweed Economy: Sustainable harvesting in the Gulf of Mannar, June 2025
85 NITI Aayog, Strategy for the development of seaweed value chain, June 2024
86 Government of Andhra Pradesh, Department of Horticulture
87 Coffee market size, share & growth industry report, 2024
88 The Research Insights, Specialty Coffee Market Size & Outlook 2030, October 2024
89 FAOSTAT database, 2025
90 Coffee Board of India, Annual Report, 2023
91 Grandview Research, 2024
92 Ministry of Agriculture & Farmers Welfare, Production of Crude Palm Oil, July 2025
93 Solvent Extractors Association of India, Import of Edible Oils, November 2024
94 National Mission on edible oil, Oil Palm, August 2021
95 Journal of Japan Institute, Economic Value of Fresh Fruit Bunch from Oil Palm Plantation as Feedstock for Bioenergy in Indonesia, 2019
96 ICAR Estimates, Horticulture Department of Andhra Pradesh
97 UN FAO Statistics, Banana Yield, 2025
98 Government of Andhra Pradesh, Final Estimates of Horticulture Crops for the Year 2023-24
99 APEDA, Banana production, 2024
100 Ministry of Food Processing Industries, Assessment study for identifying gaps in banana value chain, October 2021
101 IMARC Group, Cashew market report by form, distribution channel, application and region 2025-2033, 2024
102 World integrated trade solution database
103 Department of horticulture, Government of Andhra Pradesh
104 Coconut Development Board, All India final estimates of area and production of coconut, September 2025
105 Coconut Products Market Size, Share & Trends Analysis Report, Grand View Research, 2023
106 Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (DoST-PCAARRD)
107 Ministry of Tourism, 3rd Tourism Satellite Account, 2020
108 Government of Andhra Pradesh, Andhra Pradesh Tourism Development Corporation
109 Ministry of Tourism, Final Report on MICE Market in India and the Role of ICPB In Promoting MICE Tourism Products, June 2019
110 NITI Aayog, Identifying Potential Service Sub-Sectors: Insights from GVA, exports, and employment data, December 2024
111 IBEF, Healthcare Industry Report, 2023
112 FICCI, Decoding India's healthcare landscape, April 2024
113 Ministry of Tourism, Rajya Sabha response Unstarred question No.2219 , August 2025
114 Ministry of Tourism, National Strategy for medical and wellness tourism, January 2022
115 Lok Sabha response by Ministry of Healthcare, July 2024
116 Central Bureau of Health Intelligence, National health profile 18th issue, 2023
117 Government of Andhra Pradesh, Department of Healthcare
118 Ministry of Tourism, Tourism as a Key Driver for Employment and Growth Budget 2025-26 focuses on infrastructure, medical tourism, and heritage conservation, February, 2025
119 United Nations, World Population Prospect, 2024
120 Ministry of Statistics and Program implementation, 76th round of National Sample Survey (NSS), December 2018
121 India Care Services Market Size, Share & Trends Analysis Report by Type, By Region, And Segment Forecasts, 2024 - 2030

122 Ministry of Ayush, Decadal achievements, December 2024
123 WHO, State of world's nursing report, 2025
124 Ministry of Railways, National Rail Plan Vision – 2030, March 2022
125 Ministry of Railways & RITES, National Rail Plan 2030, 2022
126 Ministry of Railways, Dedicated Freight Corridor Scheme, April 2022
127 Ministry of Railways, Indian Railways Vision 2024; Railway Projects in Mineral Corridors; National Rail Plan – India; VMRDA Draft Perspective Plan 2051
128 Ministry of Railways, Ministry of Railways advances infrastructure with dedicated freight corridors, modernization initiatives, and enhanced freight capacity, March 2025
129 Government of Andhra Pradesh, VMRDA Draft Perspective Plan 2051
130 CII, Building East Coast Logistics Capitals: Visakhapatnam; Asian Development Bank (ADB), India's First Coastal Corridor Vizag–Chennai Industrial Corridor Conceptual Development Plan
131 Ministry of Drinking Water & Sanitation, National Rural Drinking Water program, 2013

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