



NITI Aayog

NITISंधान

Quarterly newsletter by Research and Networking (R&N) Division of NITI Aayog



Message from Vice Chairperson

India's development journey is inherently diverse, necessitating policy approaches that are adaptable, inclusive, and firmly grounded in collaboration across sectors and regions. This edition of NITISंधान reflects a sustained focus on strengthening the social and economic foundations that directly shape citizens' quality of life.

The Economic Plan for the Bhubaneswar-Cuttack-Puri-Paradeep Economic Region demonstrates how close collaboration with States can enable integrated, region-specific growth strategies that harmonise economic expansion with sustainability and preservation of cultural heritage. In parallel, the focus on natural farming signals a transition towards environmentally sustainable agricultural practices that enhance both farmers' resilience and their incomes. The framework on affordable housing highlights the importance of coordinated reforms to ensure equitable access to urban living, while initiatives to revitalise the apprenticeship ecosystem aim to strengthen the interface between education and employment.

Collectively, these efforts embody a cooperative and consultative approach to policymaking – one that empowers States, reinforces local ecosystems, and ensures that development remains inclusive, balanced, and responsive to India's evolving needs.

Shri Suman Bery
Vice Chairperson, NITI Aayog



From the desk of the CEO

At NITI Aayog, our efforts remain focused on strengthening India's economic foundations through data-driven insights and targeted policy interventions. This edition of NITISंधान highlights key analytical work in areas of trade performance, fiscal health, and export competitiveness, which are critical to sustaining inclusive and

broad-based growth.

The Trade Watch analysis provides timely insights into evolving global and domestic trade trends, enabling responsive policy action. The Fiscal Health Index offers a comprehensive assessment of state-level finances, supporting prudent fiscal management and improved resource allocation. Further, the Export Preparedness Index and sectoral studies on export promotion underscore the importance of enhancing competitiveness across regions and sectors.

Together, these initiatives aim to strengthen institutional capacity, promote balanced regional development, and ensure that the benefits of growth reach the grassroots, fostering livelihoods, employment, and economic resilience across the country.

Ms Nidhi Chhibber
CEO, NITI Aayog

About Research and Networking (R&N) Division

In 2024, NITI Aayog established the Research & Networking (R&N) Division to strengthen and streamline policy research through a robust pipeline of high-impact studies. It fosters partnerships with leading think tanks and internal divisions, building a collaborative resource network. The division also drives a multi-pronged dissemination strategy, via newsletters, reports, and policy briefs, ensuring insights are accessible and actionable, thereby positioning NITI Aayog as a hub for research excellence and strategic partnerships.

Ms Anna Roy

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NITI Spotlight: Ideas, Impact, Insights



NITI Aayog and UNICEF India signed a Statement of Intent to boost nutrition in Aspirational Districts and Blocks. Through IMPAct4Nutrition, UNICEF will provide technical expertise and mobilise CSR partnerships to strengthen maternal and child nutrition outcomes in underserved regions.

Research Publications this Quarter

- Realising the Export Potential of India's Sports Equipment Manufacturing Sector
- Fiscal Health Index - 2026
- Empowering Farmers: Natural Farming Training Toolkit & Best Practices Guide
- National Monetisation Pipeline 2.0
- Revitalising India's Apprenticeship Ecosystem
- Economic Plan For Bhubaneswar Cuttack-Puri-Paradeep
- Technology Services – Reimagination Ahead
- 11 reports on Scenarios Towards Viksit Bharat and Net Zero
- Enhancing Circular Economy of End-of-Life Vehicles; Waste Tyres; Waste Electronic and Electrical Equipment (E-waste) and Lithium-Ion Batteries in India
- Roadmap for Aluminium Sector Decarbonisation; Cement Sector Decarbonisation & Green Transition of MSMEs
- Model Curriculum for Diploma in Seaweed Farming and Entrepreneurship
- Achieving Efficiencies in MSME Sector Through Convergence of Schemes
- Export Preparedness Index 2024
- A Comprehensive Framework to Promote Affordable Housing



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Voice of our Researchers



Dr. Anshu Bharadwaj
Programme Director,
Energy; Green Transition &
Climate Change Division

Scenarios Towards Viksit Bharat and Net Zero

India stands at a pivotal moment in its growth journey. The Hon'ble Prime Minister Narendra Modi has envisioned a USD 30 trillion developed economy (Viksit Bharat) by 2047, even as climate change increasingly impacts livelihoods and ecosystems. India has also committed to Net Zero emissions by 2070, an unprecedented dual challenge for any major economy.

Figure-1: Select indicators of development

India's Development Trajectory: 2023–2047–2070 (Table E1)

	2023	2047	2070
Urbanisation	37%	51%	65%
Buildings floor space (Billion m ²)	18	37	42
Number of cars per 1,000 people	32	130–170	200–250
AC penetration	10%	65%	80%
Transport – Passenger (BPKMs)	5,693	16,450–18,000	19,400–22,600
Transport – Freight (BTKMs)	4,143	10,000–12,700	13,000–16,200
Industrial production – Steel (Mt)	127	568	821
Industrial production – Cement (Mt)	391	1,471	1,985
Farm mechanisation	47%	100%	100%

Source: NITI Aayog, Scenarios Towards Viksit Bharat and Net Zero: An Overview, Vol. 1 (Table E1).

Amid global uncertainties, NITI Aayog constituted eleven Inter-Ministerial Working Groups to develop integrated, quantifiable pathways. Rising incomes and urbanisation will drive energy demand, while enabling opportunities for efficient, low-carbon growth under two scenarios: Current Policy Scenario (CPS) and Net Zero Scenario (NZS). (See Figure-1)

Energy Demand: Improvements in energy efficiency, electrification, and circularity drive a gradual decoupling of energy demand from GDP. Despite ~11-fold GDP growth, final energy demand rises only 2–2.5 times—from 688 Mtoe in 2025 to 1465–1811 Mtoe by 2070. Primary energy supply grows to 2492 Mtoe (CPS) and 2159 Mtoe (NZS), while fossil fuel share declines from 87% to 54% (CPS) and 14% (NZS), making NZS largely non-fossil, with residual emissions managed via carbon capture. India can achieve high human development (HDI ≥ 0.8) at lower per capita energy use (55–60 GJ), reflecting greater efficiency. (See Figure-2)

Figure-2: Primary Energy Supply

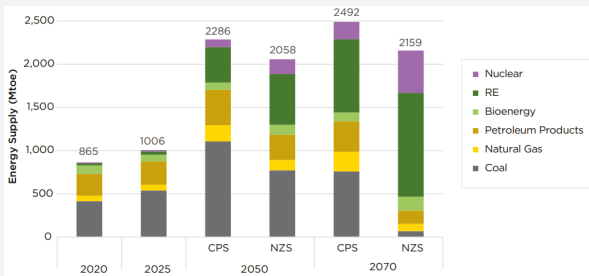
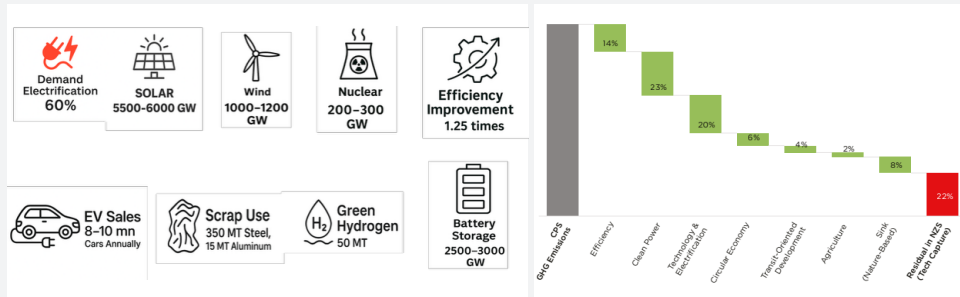


Figure-3: Select Levers of transition



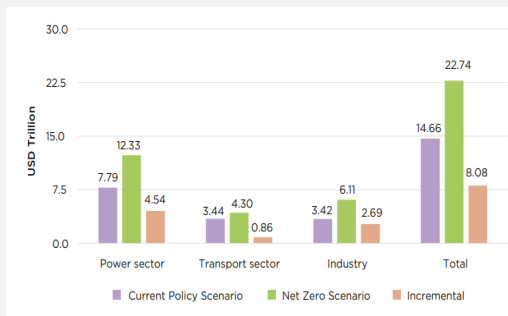
Electrification becomes the dominant mode of energy delivery, with electricity's share of final energy rising from 21% in 2025 to 40% in Current Policy Scenario and 60% in Net Zero Scenario by 2070. Demand-side transitions such as EV adoption and the use of green hydrogen further reinforce the shift toward a low-carbon, electricity-led energy system.

This surge in electricity demand is supported by a massive scale-up of clean supply (solar, wind, and nuclear), complemented by 2500–3000 GW of battery storage (See Figure-3).

Levers of Transition: Emissions reductions are driven primarily by structural shifts in the energy system—clean power, electrification, and efficiency, supported by smaller contributions from circularity, urban design, agriculture, and sinks (See Figure-4). These measures deliver the bulk of abatement. ~22% residual emissions that remain underscores the critical role of carbon capture technologies.

Finance Requirement: The study estimates USD 22.7 trillion in cumulative investment by 2070 under the Net Zero Scenario, with over half required in the power sector to enable electrification and low-carbon generation. This translates to ~USD 500 billion annually, significantly higher than current investments of ~USD 135 billion in 2024, with only USD 70–80 billion directed toward clean energy. About USD 8 trillion must be front-loaded by 2050 due to capital-intensive technologies.

Figure-4: Key levers to reduce emissions



Against the USD 22.7 trillion Net Zero investment need and estimated flows of USD 16.2 trillion, a financing gap of USD 6.53 trillion remains. This is likely to be met largely through external sources, raising their share to 42% by 2070 from 17% in 2022–23. Despite this, macroeconomic analysis suggests only a marginal impact on growth, underscoring the resilience of the Net Zero pathway and its alignment with the Viksit Bharat vision.



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Trade Watch- Quarterly July - September [Q2] FY 2025-26

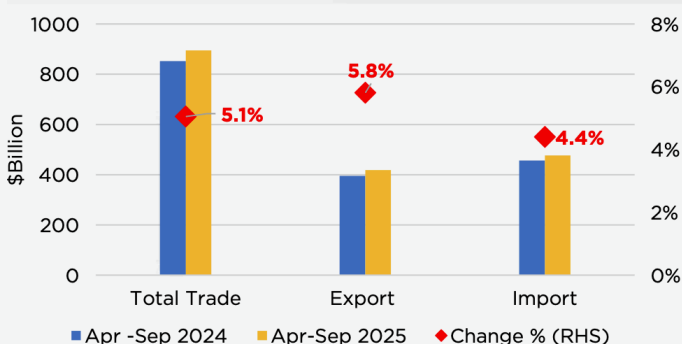
Economics and Finance-I Division

Global goods and services trade growth between July and September slowed but remained positive, with services trade growth outpacing that of goods and expanding by 4% and 2%, respectively, as compared to the previous quarter. The increase in value was driven by higher prices. The increase was supported by stronger trade performance in developing countries, with robust performance particularly in East Asia and Africa. India's merchandise and services trade performance recorded a 5.1% y-o-y increase between April and September 2025, supported by strong export growth in merchandise and services exports. During this period, total trade reached \$895.1 bn. Exports witnessed a growth of 5.8% and imports 4.4% y-o-y, with exports reaching \$418.6 bn and imports at \$476.5 bn between April and September 2025. (Fig 1)



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Fig 1: Total Trade performance between Apr-Sept'25



Economic Plan For Bhubaneswar-Cuttack-Puri-Paradeep Economic Region

Managing Urbanisation Division

NITI Aayog has unveiled the Economic Plan for the Bhubaneswar-Cuttack-Puri-Paradeep Economic Region (BCPPER) under its flagship Growth Hub (G-Hub) initiative. This roadmap aims to transform BCPPER into a \$500 billion economic powerhouse by 2047, projecting it to contribute nearly one-third of Odisha's GDP. Moving away from isolated urban development, the plan adopts an integrated regional approach that harmonises economic expansion with ecological resilience and cultural preservation.



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The blueprint outlines a project-driven strategy across all core sectors. It leverages Paradeep for port-led industrialisation, positions Bhubaneswar and Cuttack as unified knowledge and IT hubs, and develops Puri's rich heritage for global tourism. Furthermore, it modernises agriculture and aquaculture for export-led growth. Spearheaded by the proposed Economic Region Development Authority (ERDA), this ambitious plan establishes a national benchmark for sustainable and inclusive urban transformation, advancing the dream of Viksit Bharat @2047.

\$500 BILLION ECONOMY BY 2047 (Contributing One-Third of Odisha's Total GDP)



- TERTIARY SECTOR: THE KNOWLEDGE & TOURISM ENGINE**
Focuses on IT/ITeS, Global Capability Centers (GCCs), and transforming Puri into a high-value international cultural and eco-tourism destination.
- SECONDARY SECTOR: PORT-LED INDUSTRIALIZATION**
Leverages Paradeep Port to drive growth in petrochemicals, green industries, and advanced manufacturing clusters.
- PRIMARY SECTOR: AGRI-EXPORT & FISHERIES**
Transitioning from volume-based to value-based growth by positioning the region as India's premier seafood and agri-export hub.
- 89 PROJECTS AND 4 DEDICATED ZONES**
Implementation includes 89 sectoral projects and the creation of Knowledge Corridors, Port-proximate clusters, and Innovation Districts.

Realising the Export Potential of India's Sports Equipment Manufacturing Sector

Economics & Finance-II Division

India stands at a pivotal juncture to transform its sports equipment manufacturing sector into a global export powerhouse. While currently holding a modest 0.5% global market share, the sector is poised for exponential growth, targeting \$8.1 billion in exports and the creation of 54 lakh jobs by 2036. This report outlines a strategic roadmap leveraging upcoming mega-events, such as India's 2036 Olympic bid and the 2030 Commonwealth Games, to anchor domestic demand. By addressing structural cost disadvantages, modernising legacy clusters, and establishing new hubs in states like Gujarat, India can become a trusted supplier in a global market projected to reach \$300 billion.



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INDIA: THE NEXT GLOBAL SPORTS FACTORY

- FROM 0.5% SHARE TO GLOBAL PLAYER**
Global market hits \$140bn. India currently holds just 0.5%. Massive 'headroom' for growth.
- THE 2036 OLYMPIC CATALYST**
Using 2030 Ahmedabad Commonwealth Games & 2036 Olympic bid as massive demand anchors for 'Make in India' gear.
- CLOSING THE 15% COST GAP**
India faces 10-20% cost disadvantage vs. China & Pakistan. Due to high raw material duties and logistics.
- 54 LAKH NEW JOBS POTENTIAL**
Scaling to 11% global export share could generate over 5 million cumulative jobs by 2036.
- \$8.1 BILLION EXPORT OPPORTUNITY**
- SCALE THROUGH MODERN CLUSTERS**
Moving beyond old clusters. Develop 4 new greenfield, port-proximate manufacturing hubs.

Model Curriculum for Diploma in Seaweed Farming and Entrepreneurship

Agriculture Technology Division

The report aims to unlock India's vast seaweed potential and empower over 5 million coastal fishermen. The comprehensive curriculum covers the entire seaweed value chain, including cultivation techniques, disease management, post-harvest processing, and product marketing. By equipping the youth and coastal communities with essential skills, the report seeks to foster sustainable employment, boost entrepreneurship, and enhance rural economic prosperity.



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Model Curriculum for Diploma in Seaweed Farming and Entrepreneurship

- 9 Million Tons of Untapped Potential**
9,000,000 TONS Untapped Potential. India currently produces only 34,000 tons, leaving over 98% of its cultivation capacity ready for development.
- A Carbon-Sequestration Powerhouse**
57.64 TONS of CO₂ per Hectare per Year. Mariculture seaweed can sequester.
- Empowering 5 Million Coastal Fishermen**
₹13 LAKH Potential Revenue per Annum. This sector provides stable, high-income livelihoods, particularly for women, with potential revenue of ₹13 lakh per annum.
- A Complete 360° Value Chain**
From planting material and scientific harvesting to processing biodegradable films and liquid fertilizers.



Circular Economy Reports

Green Transition Climate & Environment Division

Advancing Circular Economy of E-waste and Lithium-Ion Batteries

Rapid growth in e-waste and lithium-ion batteries is largely managed by the informal sector using unsafe methods. The report calls for expanding Extended Producer Responsibility (EPR) to cover critical minerals, upgrading recycling infrastructure, setting purity standards, and formalising the workforce to secure supply chains and reduce imports.



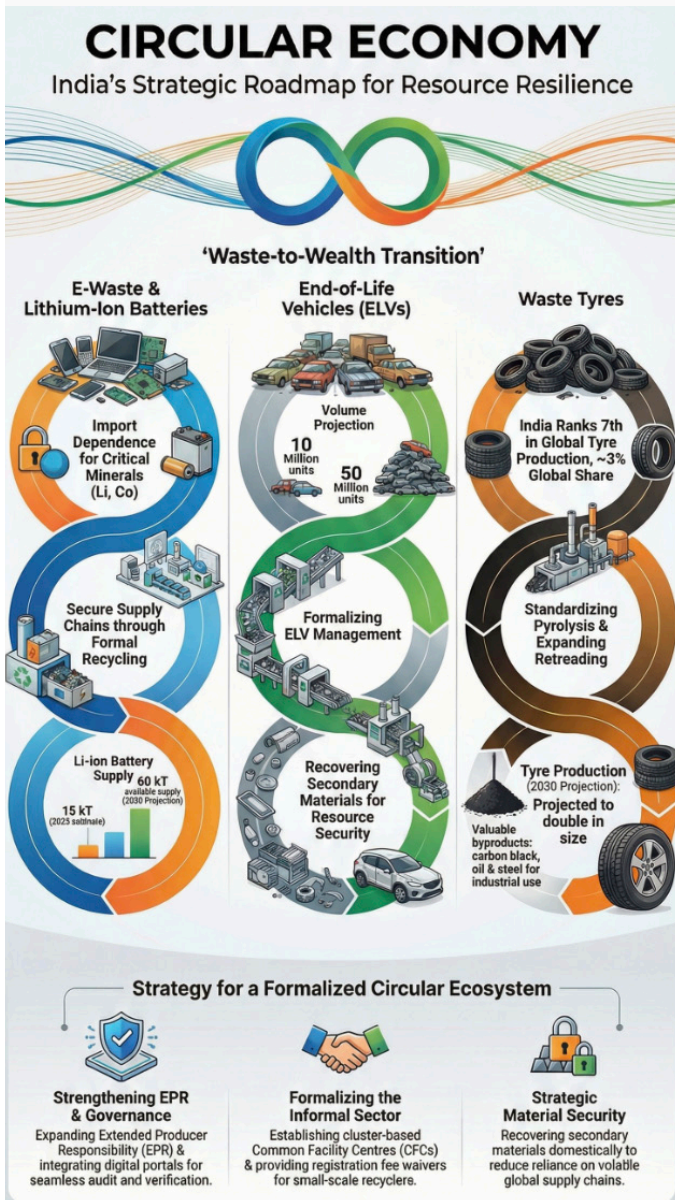
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Enhancing Circular Economy of End-of-Life Vehicles (ELVs)

India's ELVs may reach 50 million by 2030, with informal scrapping causing pollution and material loss. The report stresses strengthening EPR, leveraging carbon credits, improving awareness, and scaling formal scrapping through Automated Testing Stations (ATS) and Registered Vehicle Scrapping Facilities (RVSFs).

Enhancing Circular Economy of Waste Tyres

With tyre waste set to rise, current recycling lacks traceability and standards. The report recommends revising EPR norms, setting standards for Tyre Pyrolysis Oil (TPO) and recovered Carbon Black (rCB), and promoting retreading to extend lifespan and reduce environmental impact.



Roadmaps for Decarbonisation and Green Transition

Energy Division

India's pursuit of net-zero emissions by 2070 requires balancing rapid economic growth with urgent environmental action. To achieve this, NITI Aayog has developed strategic roadmaps guiding the green transition across critical hard-to-abate industries.



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Aluminium Sector

This roadmap focuses on decarbonising the highly energy-intensive smelting process. It recommends a phased transition starting with Round-The-Clock Renewable Energy (RE-RTC), integrating small modular nuclear reactors, and retrofitting existing coal plants with CCUS.

Cement Sector

To tackle significant thermal and process emissions, this framework prioritises substituting coal with refuse-derived fuel (RDF) from municipal waste, expanding the use of clinker substitutes, and scaling CCUS pilot projects.

MSME Sector

This strategy empowers small enterprises to lower operational costs and emissions through three core levers: enhancing energy efficiency, adopting green electricity like rooftop solar, and transitioning to alternative fuels with targeted financial support.

Roadmap for Decarbonisation and Green transition.

NITI Aayog's strategic overview to align India's industrial growth with global climate goals through technological and policy interventions for Aluminium, Cement, and MSME sectors.



HEAVY INDUSTRY: ALUMINIUM

Transformative Solutions

Decarbonising power supply via renewable energy, nuclear power, and CCUS for captive coal plants.

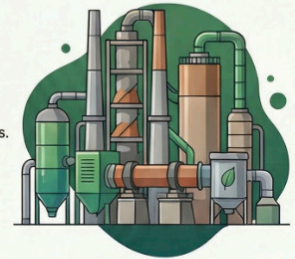
10% 2030 Emission Reduction Targets in aluminium emissions.

HEAVY INDUSTRY: CEMENT

Three-Pronged Strategy

Scaling carbon capture (CCUS), increasing clinker substitutes, and developing alternative fuel supply chains.

100-150 MtCO₂ 2030 Emission Reduction Targets Savings in cement



ENABLING THE MSME GREEN TRANSITION

The Three Critical Pillars

Modernising machinery through technology adoption, improving financial accessibility, and enhancing sector capacity.

Future-Proofing Global Trade

Aligning MSMEs with international standards like CBAM to ensure export eligibility and competitiveness.

Economic Resilience and Job Creation

Transforming vulnerable enterprises into resilient competitors while creating thousands of new green jobs.



Empowering Farmers: Natural Farming Training Toolkit & Best Practices Guide

Agriculture Technology Division

This training manual serves as a comprehensive guide for implementing natural farming in India. It presents an agricultural framework that replaces synthetic chemicals with livestock integration, bio-inputs, and agroecological principles to restore soil health and reduce production costs. The text traces the evolution of these practices from traditional knowledge systems to modern approaches focused on sustainability and climate resilience. It includes practical guidance on seed treatment, water conservation, and crop management. The English manual is designed to help Extension Officers implement promotion programs, while a separate Hindi manual has been developed specifically to support farmers.



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The New Old Way: Farming in Harmony with Nature

Natural Farming is a chemical-free, livestock-based system that restores soil health while drastically reducing a farmer's financial burden.

Biology Over Chemistry

On-farm biomass vs Synthetic fertilizers

A self-reliant system using on-farm biomass, cow dung, and urine instead of expensive synthetic fertilizers.

The Four Pillars of the Toolkit

Beejamrit (Seeds)

For seeds

Jeevamrit (Soil)

For soil

Mulching (Moisture)

For moisture

Whapasa (Aeration)

For aeration

Better Returns, Resilient Crops

Natural Farming 2.4:1 Benefit-Cost Ratio; Superior Root Development (Survives Disasters)
Conventional Less Resilience; Vulnerable to Shocks

Drastic Cost and Resource Savings

up to **150-60%** Water and Electricity Savings
up to **85%** Reduction in Greenhouse Gas Emissions

Revitalising India's Apprenticeship Ecosystem: Insights, Challenges, Recommendations and Best Practices

Skill Development, Labour and Employment Division

The report offers a strategic roadmap to align skill development with the Viksit Bharat @2047 vision. It comprehensively evaluates flagship schemes like National Apprenticeship Promotion Scheme (NAPS) and National Apprenticeship Training Scheme (NATS), highlighting both achievements and critical challenges such as regional disparities, low MSME participation, and high apprentice dropout rates.

To effectively bridge the education-to-employment gap, the report presents a five-pillar recommendation framework. Key policy proposals include launching a unified National Apprenticeship Mission (NAM), creating a Startup Apprenticeship Programme (SAP), and linking apprenticeships seamlessly with academic credits. Ultimately, this blueprint aims to build a dynamic, inclusive, and future-ready Indian workforce.



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FUTURE-READY APPRENTICESHIPS: INDIA'S ROADMAP TO 2047

- 1. LAUNCH A UNIFIED NATIONAL APPRENTICESHIP MISSION**
Consolidate diverse schemes (NAPS/NATS) into a single "NAM & NAP" portal for seamless registration and management.
- 2. INTEGRATE SKILLING WITH FORMAL EDUCATION CREDITS**
Align apprenticeships with the National Credit Framework to enable "Earn While You Learn" pathways in higher education.
- 3. EXPAND TO STARTUPS AND GIG ECONOMY**
Introduce the Startup Apprenticeship Programme (SAP) and digital workforce frameworks to modernize training sectors.
- 4. BOOST INCLUSION VIA TARGETED FINANCIAL INCENTIVES**
Implement the Apprenticeship-Linked Incentive Scheme specifically for women, North-East states, and aspirational districts.
- 5. STRENGTHEN ASPIRANT SOCIAL SECURITY AND WELFARE**
Provide insurance, travel/accommodation support, and standardized stipends to improve apprentice retention and completion rates.

National Monetisation Pipeline 2.0

Public-Private Partnerships Division

The report outlines a strategic five-year framework (FY26 to FY30) to unlock value from brownfield and greenfield public-sector assets. With an ambitious target of INR 16.72 Lakh Crore across 12 sectors, it aims to mobilise private capital for reinvestment into new infrastructure creation. Covering critical areas like highways, railways, power, ports, and coal, NMP 2.0 leverages models like InvITs, TOT, and PPPs to enhance operational efficiency while retaining public ownership. This capital recycling mechanism will significantly accelerate infrastructure expansion, generate employment, and directly support the long-term vision of Viksit Bharat @2047.



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National Monetisation Pipeline 2.0: Building Viksit Bharat

₹16.72 LAKH CRORE MONETISATION TARGET

Total estimated value to be unlocked between FY2025-26 and FY2029-30.

12 CORE SECTORS FOR GROWTH

HIGHWAYS, MMLPs & ROPEWAYS	RAILWAYS	POWER
WAREHOUSING AND STORAGE	URBAN INFRASTRUCTURE	COAL
POWER	PETROLEUM AND NATURAL GAS	CIVIL AVIATION
COAL	MINES	TELECOM

THE 'BIG FOUR' REVENUE DRIVERS

Highways, Power, Ports, and Railways account for the largest share of the monetisation pipeline.

CAPITAL RECYCLING FOR NEW ASSETS

BROWNFIELD ASSETS (Public Ownership) → **REINVESTMENT** → **NEW INFRASTRUCTURE CREATION**
Proceeds are reinvested into new infrastructure creation while retaining public ownership of strategic assets.



Scenarios towards Viksit Bharat and Net Zero

Energy Division

India stands at a decisive moment in its history, undertaking a developmental journey with no historical precedent. These 11 reports provide an integrated, multi-sectoral blueprint for how India can transform into a developed nation while leading the global fight against climate change.

The Dual Ambition: Prosperity and Climate Action

The core vision is to propel India into a USD 30 trillion developed economy by 2047, while simultaneously achieving Net Zero greenhouse gas emissions by 2070. No major economy has ever attempted to scale its GDP nearly eightfold within a single generation while actively redirecting its energy and industrial systems toward a low-carbon pathway. These reports assert a 'development-first' approach, demonstrating that climate action and rapid economic growth can advance together to improve living standards, build adaptive capacity, and eradicate poverty.

Driving Sectoral Transformations

To realise this vision, a profound structural shift is required across all major economic sectors. The reports outline pathways for deep demand electrification, energy efficiency, and a transition to clean power. By 2070, electricity's share in final energy demand must jump to 60%, driven by electric mobility, efficient buildings, and industrial electrification. Hard-to-abate industries will rely on green hydrogen, carbon capture, and circular economy practices. Meanwhile, the transport and building sectors will require transit-oriented urban planning, modal shifts, and rigorous enforcement of energy codes to avoid locking in inefficiencies.

The Trillion-Dollar Financing Opportunity

Transitioning to Net Zero is an investment-intensive endeavour. The models estimate a cumulative investment requirement of USD 22.7 trillion by 2070 under the Net Zero Scenario. While this reveals a financing gap of USD 6.5 trillion against projected flows, mobilising long-term, concessional international capital and deepening domestic markets can bridge this divide. Crucially, the macroeconomic assessments reveal that the Net Zero transition has only a marginal impact on long-term GDP growth, and will significantly lower India's fuel import bills, ultimately strengthening the country's macroeconomic and external resilience.


Securing Supply Chains and Social Equity

A low-carbon future brings new dependencies, particularly regarding Critical Energy Transition Minerals (CETMs) like lithium, copper, and nickel. The reports emphasise that mitigating supply chain vulnerabilities requires scaling domestic processing, aggressive recycling, and strategic international partnerships. Furthermore, the transition must be just and equitable, as it will profoundly impact land use, water resources, and millions of fossil-fuel-dependent livelihoods. By integrating targeted reskilling, regional diversification, and behavioural nudges anchored in Mission LIFE, India can ensure that its path to Net Zero is inclusive, creating green jobs while protecting vulnerable communities.



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Scenarios towards Viksit Bharat and Net Zero



\$30 Trillion Aspiration (Viksit Bharat) by 2047

MACROECONOMIC IMPLICATIONS & VISION


- Aim to reach GDP of \$30-31 trillion by 2047 with 7-0% annual growth even under Net Zero constraints.
- Minimal Long-term GDP Impact: Marginal -0.5% deviation in total GDP compared to current policy by 2030.
- Resilience through Foreign Finance: Utilizing external capital like FDI to prevent crowding out of domestic savings.



\$22.7 Trillion Total Investment Needs

FINANCING THE GREEN TRANSITION


- Achieving Net Zero by 2070 requires \$9.1 trillion in incremental investment beyond current policy.
- The Challenge of Front-Loading: Between 2026 and 2030, needs an extra \$90 billion annually to scale renewable capacity and grid infrastructure.
- Emerging Tech Dominates Late-Century Costs: By 2070, transmission, grid storage, and charging infrastructure will account for approximately 57% of total transition investments.



169 Million Tonnes of Mineral Demand by 2070

CRITICAL MINERALS & SUPPLY CHAIN SECURITY


- Net Zero Scenario requires 81% more Critical Energy Transition Minerals than Current Policy Scenario.
- Copper and Graphite: The Heavyweights: These two minerals comprise nearly two-thirds of cumulative demand.
- Scale and Timing: Over 66% of cumulative Critical Energy Transition Minerals (CETMs) demand materialises after 2050.



Scaling Nuclear to 300 GW by 2070

POWER SECTOR TRANSFORMATION


- Nuclear power is a strategic pillar, targeted to grow from 8.8 GW (2025) to 100 GW by 2047.
- Coal Management: Coal capacity is projected to rise to 400 GW in NZS by 2050.
- India's Renewable Energy (RE) capacity is projected to surge from 229 GW in 2025 to 6,300-6,900 GW by 2070 under NZS.



Decoupling Industry from Emissions

INDUSTRIAL & BUILDING DECARBONIZATION


- Industry accounts for 24% of total GHG emissions, one of the hardest-to-abate sectors; its decarbonization depends on scaling technologies that remain pre-commercial or costly at scale.
- India's rapidly expanding infrastructure and real estate demand can be met more sustainably by increasing the use of scrap and recycled materials, reducing reliance on virgin resources and lowering greenhouse gas emissions. Adopting circular economy principles, focused on reuse, recycling, and recovery, can significantly curb demand for primary materials. Under a Net Zero pathway by 2070, the share of scrap is projected to rise to 40% in steel (from -21%) and aluminium (from -27%), while the clinker-to-cement ratio is expected to decline from 0.67 to 0.55.



90% Low-Carbon Fuel Mix by 2070

SUSTAINABLE TRANSPORT & URBAN MOBILITY

- Petroleum products phased out from road transport, replaced by electricity, biofuels, and hydrogen.
- The 'Avoid-Shift-Improve' Modal Shift: Passenger rail share targeted to rise to 25%, while road share drops from 78% to 64% as metro rail length expands.
- Aviation: The Hardest Core: Aviation Turbine Fuel (ATF) expected to be the primary residual fossil fuel by 2070 due to high decarbonization challenges.



Managing a 'Just Transition'

SOCIAL & ENVIRONMENTAL IMPLICATIONS

- Over 150 districts dependent on fossil fuel supply chains, affecting one-third of India's population.
- 7 Million New Energy Jobs: The Net Zero pathway is projected to create 1 million more jobs by 2050 than current policy.
- Land and Water Pressures: Net Zero requires nearly 6 million hectares of land by 2070; 56% of solar installations are currently in water-stressed zones.

Scenario	Land (Million Hectares)	Water (Billion Cubic Meters)
Current Policy Scenario (CPS) 2090	2.55	10.9
NZS 2090	3.26	11.87
CPS 2070	4.18	9.13
NZS 2070	3.92	9.90

2045: Coal Capacity Peaks

2047: Viksit Bharat (Developed Status, \$30T GDP)

2070: Net Zero Emissions



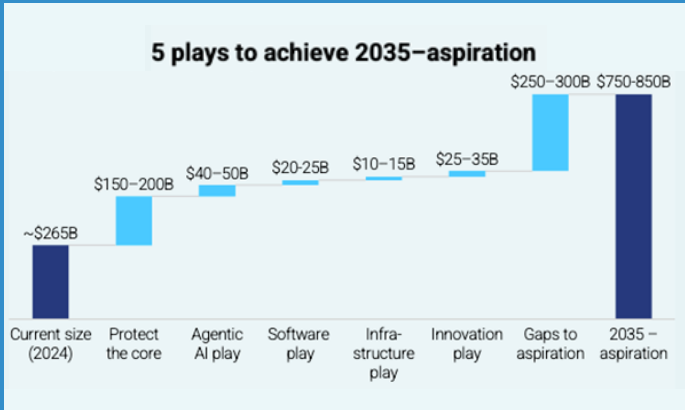
Technology Services – Reimagination Ahead

Frontier Tech Hub Initiative

The roadmap presents a ten-year approach to transform India's \$265 billion technology services sector into a \$750–850 billion industry by 2035. It highlights an AI-driven inflection point, urging a shift from labour-arbitrage models to AI-native, IP-led and platform-based services. Key growth levers include Agentic AI, SaaS, digital infrastructure, innovation-led engineering and capturing India's rapidly expanding domestic market. The roadmap urges industry to expand into new verticals and geographies, build defensible IP and reimagine R&D; and calls on government to establish a National Tech Services Single Window—anchored by an inter-ministerial group—to drive ease of doing business, enable global market access and prepare the workforce for the AI transition, driving high-quality jobs and supporting the Viksit Bharat 2047 vision.



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AI-Preneurs of India

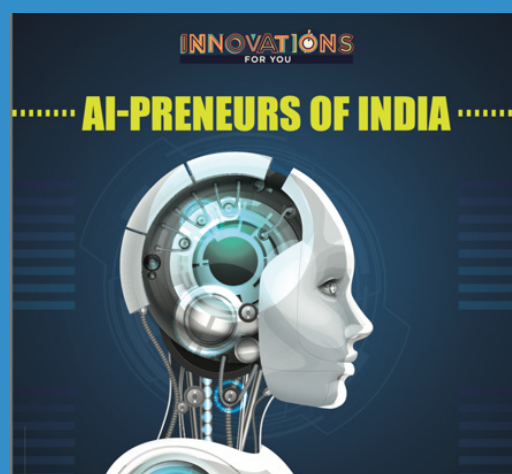
Atal Innovation Mission

The AI-Preneurs of India compendium, part of the Innovations for You coffee table series by Atal Innovation Mission, showcases 45 entrepreneurs leveraging artificial intelligence to address critical challenges in sectors like healthcare, agriculture, sustainability, and governance. The 7th edition highlights a new wave of innovators combining technology with purpose to drive inclusive and responsible solutions. It reflects India's growing strength in AI-led entrepreneurship, where innovation meets societal impact. Supported by AIM's extensive ecosystem, these startups exemplify how mentorship, infrastructure, and vision can enable scalable, context-driven solutions for national and global challenges.



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Author: **Garima Ujjainia**,
Innovation Lead, AIM



India's Blueprint for Affordable Urban Housing

Understand the urgent structural reforms needed to bridge India's widening urban housing gap.

THE CURRENT HOUSING CRISIS IS A 'SELLER'S MARKET' WHERE HIGH LAND COSTS AND SHRINKING AFFORDABLE STOCK EXCLUDE 85% OF URBAN HOUSEHOLDS

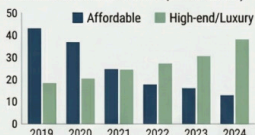
URBAN POPULATION TO HIT 85 CRORES

85 CRORES
BY 2050

The massive shift from 50 crores in 2021 requires a resilient, accessible urban housing framework.

AFFORDABLE STOCK STEADILY DECLINING

BUDGET SEGMENTATION (2019–2024)



Market supply has shifted toward high-end units, leaving the affordable segment at a decade-long low.

SUPPLY-ABSORPTION: SELLERS' MARKET TREND



STANDARDIZING THE 'AFFORDABLE' URBAN HOME



METROS:
Targets 60 sqm (₹60L cap)



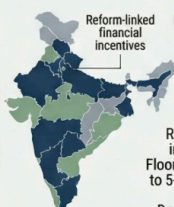
NON-METROS:
Targets 90 sqm (₹45L cap)

LAND COSTS CONSUME 70% OF BUDGETS



High acquisition costs and 1 crore vacant houses create a systemic barrier to formal ownership.

REFORM-LINKED FINANCIAL INCENTIVES & BUILDING NORMS



RELAX BUILDING NORMS AND INCREASE FAR

Recommendations include increasing Floor Area Ratio (FAR) to 5-6 and prioritizing Transit-Oriented Development (TOD).

A Comprehensive Framework to Promote Affordable Housing

Managing Urbanisation Division

With India's urban population projected to reach 85 crore by 2050, a 5–7 crore unit housing deficit persists. This report proposes a paradigm shift from demand-driven subsidies to structural reforms in land, finance, and tenancy. Key interventions include reserving 10% of residential land for affordable housing, raising the Floor Area Ratio to 5–6, and adopting the Model Tenancy Act to unlock 1 crore vacant homes. Financial catalysts like tax-free bonds and Section 80-IBA profit exemptions aim to mobilise private capital. Linking urban mission funding to state-level reforms ensures a scalable, inclusive housing ecosystem.



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Export Preparedness Index 2024

Economics & Finance-II Division

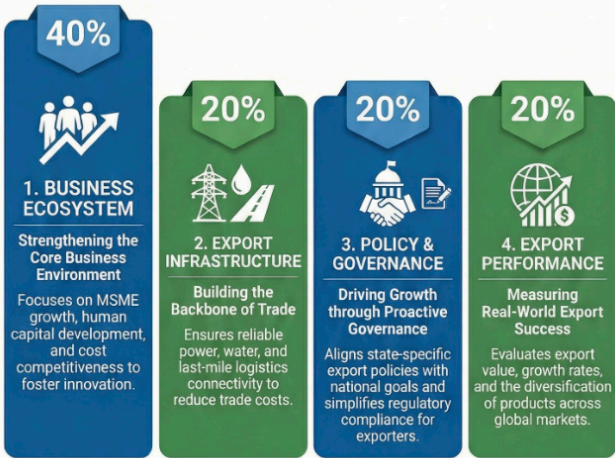
The Export Preparedness Index (EPI) 2024, developed by NITI Aayog, assesses the export readiness of Indian States and Union Territories. Utilising a structured, data-driven framework, it evaluates regions across four core pillars: Export Infrastructure, Business Ecosystem, Policy & Governance, and Export Performance. By categorising states into Leaders, Challengers, and Aspirers, the index highlights regional strengths and gaps to guide targeted policies and boost India's global trade competitiveness.



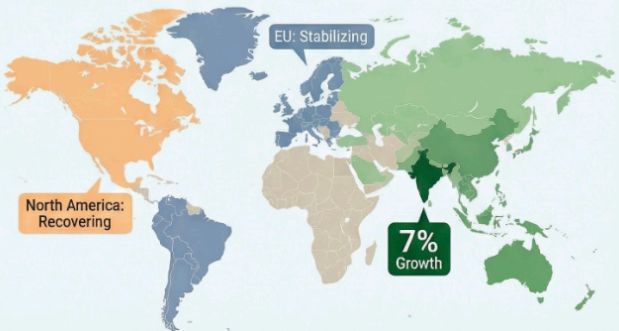
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INDIA'S EXPORT ROADMAP: THE 2024 PREPAREDNESS INDEX

Strengthening sub-national ecosystems across four critical pillars



GLOBAL TRADE LANDSCAPE India Leads Regional Growth at 7%



Achieving Efficiencies in the MSME Sector Through Convergence of Schemes

Industry & Foreign Investment Division

The report addresses the inefficiencies, duplication of efforts, and fragmented delivery of government support to Micro, Small, and Medium Enterprises (MSMEs). To optimise resource allocation and maximise impact, the study advocates for strategic convergence across various ministries and departments.

It proposes two main pillars to achieve this: Information Convergence, which involves creating a centralised, AI-powered digital portal to integrate data and streamline access to schemes, and Process Convergence, which aims to unify overlapping initiatives and foster Centre-State collaboration. Key actionable recommendations include merging similar programs like SFURTI with MSE-CDP, consolidating various skill development programs, and aligning domestic and international marketing initiatives to ensure sustainable growth for the sector.

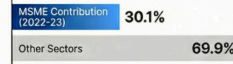


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MSMEs: The Engines of India's Economic Growth

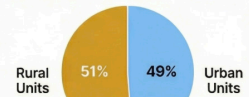
Illustrating massive economic footprint and rising government investment

MSMEs Drive ~30% of National GDP



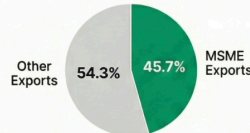
The sector's contribution remained resilient, recorded at 30.1%.

Balanced Presence Across Rural and Urban India



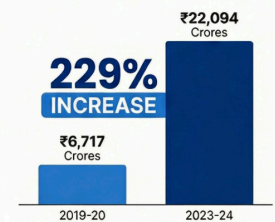
51% of MSME units are in rural areas, reflecting entrepreneurial spirit despite gaps.

Fueling 45.7% of Total All-India Exports



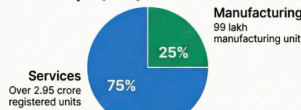
MSME-related products maintain a dominant share, peaking near 50% pre-pandemic.

229% Surge in Government Budget Outlay



Government spending on MSMEs rose significantly from 2019-20 to 2023-24.

Services Dominate the MSME Landscape (75%)



Service-based enterprises vastly outnumber manufacturing units.

Working Papers this Quarter

- Education and Skilling for Employment: From Credentials to Learning Outcomes
- Gondwana: Economic Integration of Indian Ocean Region



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