



advocates & solicitors

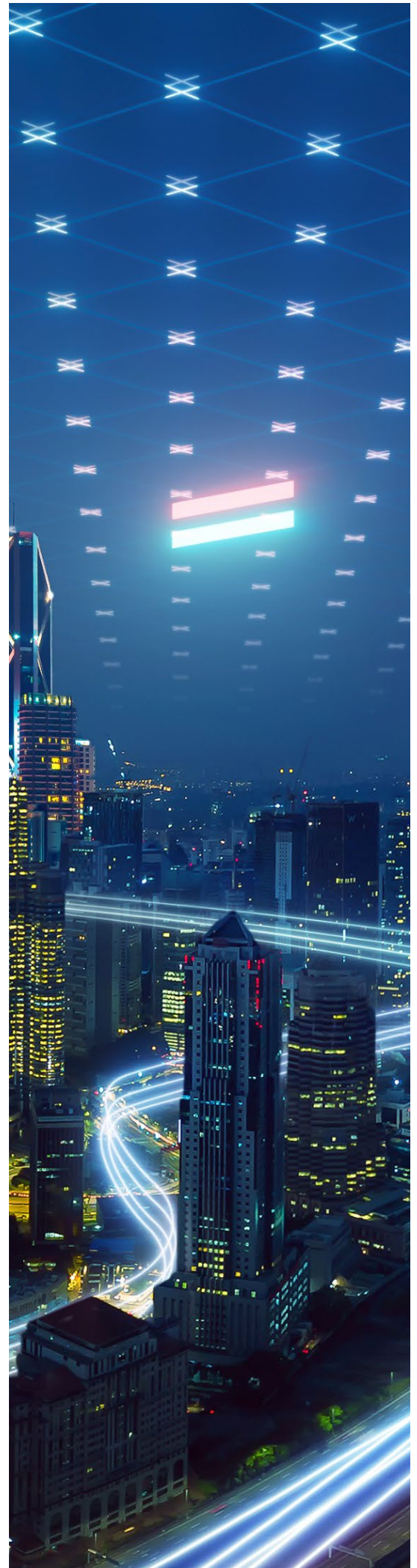


India Energy & Infrastructure Report - 2023



India is expected to be an engine of global growth in coming years. The infrastructure sector will play a critical role in fueling India's economic growth. The blueprint for this role has been laid down in the National Infrastructure Pipeline issued in December 2019. Infrastructure will also play other important roles, *viz.*, catering to modern lifestyles, enhancing competitiveness, creating jobs, and dealing with the disruptive effects of climate change and rapid technological development.

However, there are challenges to upscaling and accelerating investment in infrastructure, with particular focus required on closing the credit gap, addressing public and private sector capacity constraints, balancing public welfare and ensuring investor viability, the imperative of identifying, allocating and mitigating risk, and time-bound and efficacious resolution of disputes.



Contents

The Role of Energy & Infrastructure, in India Becoming a US\$ 10 trillion Economy	7
1. Indian Economy: Chosen Path of Growth with Sustainability & Energy Transition	7
2. India's Climate Action Efforts	10
3. The Push for Renewable Energy and Sustainable Consumption	10
4. The Challenges Ahead	14
5. Way Forward	18
6. Building for a Better Tomorrow	24
Appendix - A Budget Highlights FY 23- FY24	26
A.1. Union Budget 2023-2024	26
Partners : Energy & Infrastructure	29



The Role of Energy & Infrastructure, in India Becoming a US\$ 10 trillion Economy

1. Indian Economy: Chosen Path of Growth with Sustainability & Energy Transition

Indian economy bounced back with total output and consumption surpassing pre-pandemic levels. The World Bank acknowledged that in the face of new headwinds of inflation, slowing global growth and the war in Ukraine, the Indian economy has been remarkably resilient¹. As per the Economic Survey, 2022-23, after a long period of balance sheet repair in the financial and corporate sector through wide range of structural reforms and policy initiatives, the financial cycle is poised to turn upward. This is the primary reason for expecting India's growth to be better than it was in the pre-pandemic years. India is projected to be one of the fastest growing major economies in the world with an ambitious target of growing to a US\$ 10 trillion economy by 2030-2035 and US\$ 26 trillion by 2047, to emerge as the world's third largest economy behind the United States and China.

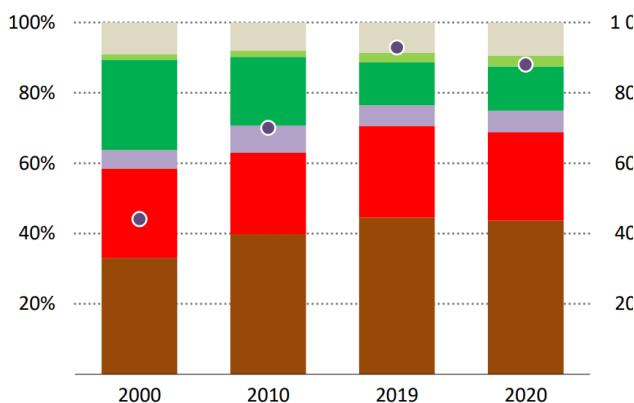


Fig. 1: Total Primary Energy Demand in India (Source: IEA)

¹<https://documents1.worldbank.org/curated/en/099143112052224154/pdf/IDU0d4ad74a108a3304f93083990163996425f3a.pdf>.

²<https://www.imf.org/en/News/Articles/2022/12/19/pr22444-india-imf-executive-board-concludes-2022-article-iv>

As per International Monetary Fund's latest World Economic Outlook projections, India's Gross Domestic Product ("GDP") is projected to grow at 6.8 % in 2022-23 and at 6.1 % in 2023-2024, making India one of the fastest growing major economy in the world for both the years². India is poised to achieve an average of 6.5% real GDP growth in the medium term.³ Hence, India has an unprecedented opportunity to chart its course of economic growth, while addressing the sustainability imperative with a clear, realizable, and actionable path to energy transition.

Indian Energy and Infrastructure: State of Play, Challenges and Path Ahead

Robust and resilient infrastructure and particularly energy is critical for actualizing India's potential to growth - driven by the growing population dependent on modern amenities. India is poised to meet challenges of global competitiveness, responding to the disruptive effects of climate change as also fast paced technological innovations with digital transformation.

1.1. Growth Imperatives for Energy

- There will be increased energy consumption due to rapid urbanization, increased industrialization and a growing population. India's population is projected to reach 1.52 billion by 2030, of which 42% will be in urban areas (up from the current 31%) with attendant needs of modern life.
- India relies heavily on imported fossil fuels, particularly oil and natural gas, making India vulnerable to the risks of price volatility and supply disruptions. Diversifying the fuel mix and reducing import dependency are crucial for India's energy security needs.
- India's emergence, growth and success as a global economic and geo-political superpower hinge heavily on ensuring that its energy needs are adequately met. India's chosen path focuses on: -
 - Ambitious growth of renewable sources of energy in our energy-mix.
 - Growing investments in nuclear energy and hydro-electricity.

consultation#:~:text=Real%20GDP%20is%20projected%20to,gradually%20over%20the%20next%20year.

³

<https://www.indiabudget.gov.in/economicsurvey/doc/echapter.pdf>

- Increasing exploration and domestic production of oil and natural gas, while attracting investment in the sector.
- Investing in energy efficiency measures to reduce energy consumption.
- Making India a global hub for production and export of green hydrogen.

1.2. Budgetary Proposals

- At the anvil of the 75th year of the Republic, the Union Budget 2022-23, set out a vision and blueprint to guide India's economy over the next 25 years – ‘Amrit Kaal’. As projected by the E&Y Report, the initiatives have made significant progress and received adequate funding in 2022-23.⁴
- Union budget for FY 2023-24 (“**Budget**”), is the first Budget in Amrit Kaal and is expected to give impetus to infrastructure investment and establish pathways for energy transition and growth, having regard to India’s economic, environmental and energy security needs. Key highlights of the Budget are set out in **Appendix A**.
- Salient features of the Budget for energy and infrastructure include:
 - An outlay of INR 350,000 million priority capital investment for energy transition investment, energy security, energy transition and net zero objectives by Ministry of Petroleum & Natural Gas, GoI.
 - Target to reach green hydrogen annual production of 5MMT by 2030 to facilitate transition of the economy to low carbon intensity and to reduce dependence on fossil fuel imports. An outlay of INR 197,000 million has been allocated to achieve this target.
 - Green Credit Programme to be notified under the Environment (Protection) Act to incentivize and mobilize additional resources for environmentally sustainable actions.
 - Battery energy storage systems with capacity of 4,000 MWh to be supported with VGF, to steer the economy on the sustainable development path. Pursuant to this announcement, the Union Cabinet has approved a ‘Scheme for Viability Gap Funding’ that envisages development of 4,000 MWh of BESS projects by 2030-31, with a financial support of up to 40% of the capital cost as budgetary support in the form of viability gap funding. The scheme has an initial outlay of Rs.

9,400 crore, including a budgetary support of Rs. 3,760 crore. By offering support, the scheme targets achieving a levelized cost of storage ranging from Rs. 5.50-6.60 per kilowatt-hour. The funding shall be disbursed in five tranches linked with the various stages of implementation of the project.

- INR 207,000 million outlay provided for ISTS system for evacuation of 13 GW renewable energy from Ladakh.
- Hike in the capital expenditure by 33 % to INR 10 trillion for infrastructure development for 2023-24 which will be at 3.3 % of the GDP (almost three times the outlay in 2019-20).
- Allocation for Indian Railways to the tune of INR 2.4 trillion. Highest ever outlay in the history of railways, almost nine times the outlay made in 2013-14.
- To attract private investment in infrastructure sectors like railways, roads, urban infrastructure and power, the newly established Infrastructure Finance Secretariat to assist all stakeholders.

1.3. Monetization Strategy

- GoI launched the National Monetisation Pipeline (“**NMP**”) in August 2021 to:
 - Unlock value from existing public infrastructure to enable accelerated infrastructure creation.
 - Bring efficiencies in infrastructure operation and maintenance.
- NMP envisages limited period public private partnerships or capital market structures with mandatory hand back of assets at the end of transaction life. Monetisation proceeds are envisaged to be deployed into new infrastructure creation leading to a multiplier impact on the economy.
- Over four years from FY22 to FY25, around INR 6 trillion (US\$ 7.5 bn approx) is expected to be realised by respective public sector asset owners in form of accruals or by way of private sector investments.
- From an energy security perspective, the monetization efforts must focus on the following energy infrastructure assets held by public entities:

Asset Class

Key Variable Asset

⁴ <https://www.indiabudget.gov.in/doc/impbud2022-23.pdf>

Power transmission	Transmission network and substations
Power generation	Thermal generation (60,224 MW) Hydro & renewable generation (12 GW)
Natural Gas Pipeline	19,998 km of operational network
Petroleum & products pipeline	14,623 km of pipeline network

1.4. Pipeline of Projects

- National Infrastructure Pipeline for 2020 - 2025 (“NIP”) announced by the GoI in 2019 underscores importance of creating and upgrading infrastructure. NIP seeks infrastructure creation to boost GDP growth, generate employment and income, spurring domestic demand - to “*smoothen urbanisation by promoting ease of living and facilitating economic activity.*”

Strategic Goals of NIP

- Provide an enabling environment for infrastructure investment at federal, state and local levels.
 - Design, construct and maintain resilient public infrastructure projects to meet efficiency, equity, and inclusiveness goals.
 - Benchmark infrastructure performance to global best practices and standards.
 - Leverage technology to enhance service standard, efficiency, and safety.
 - Create a fast track institutional, regulatory and implementation framework for infrastructure.
- NIP envisages total capital expenditure of US\$ 1.4 trillion (INR 111 trillion) across all infrastructure sectors during 2020 to 2025. Sector-wise capital expenditure targets are set out below:

Sector	~Share of Total
Energy (including renewables)	24%
Transport (roads, railways, ports, airports)	32%
Urban Development	17%
Irrigation and Rural Infrastructure	15%
Digital Infrastructure	3%
Social Infrastructure	4%
Industrial Infrastructure	3%

- While emphasising the importance of infrastructure in India becoming a US\$ 10 trillion

economy, the NIP recognises the following complexities of infrastructure development:

- Lack of infrastructure is the primary constraint on economic growth.
- Lead time associated with infrastructure development and changes in consumption require decisions to be taken now to shape the future, to mitigate and adapt to climate change imperatives.
- Government is increasingly looking to partner with the private sector in diverse formats.
- An increase in natural disasters or unpredictable events will test the resilience of infrastructure, in terms of reconstruction as well as supply-chain disruptions.
- New technologies (e.g., Internet of Things, Artificial Intelligence) will make infrastructure more efficient and sustainable.
- Solutions have to be found to the issue of financing infrastructure of the scale needed.
- A solid foundation for infrastructure development and creation has been established with the NIP and NMP, offering a wide range of options for international investment and collaboration.

1.5. Make in India

- The ‘Make in India’ initiative was launched in 2014 to facilitate investment, foster innovation, build best in class infrastructure, and make India a hub for manufacturing, design, and innovation.
- Steps have been taken to improve ‘Ease of Doing Business’.
- Public procurement has been strengthened to promote domestic manufacturing (with stipulations giving preference to local suppliers) with production-linked incentive (“PLI”) schemes for key sectors.
- India's rank in the ‘Ease of Doing Business’ rankings released by the World Bank has improved from 142 in 2014 to 63 in 2022.

- To address energy security concerns special emphasis is laid on ACC batteries, solar modules, and semiconductors.
- In 2021-22, the PLI schemes announced across 14 (fourteen) sectors for achieving the *Atma Nirbhar Bharat's* vision received an excellent response. As of December 2022, 717 applications have been approved and are under implementation with more than 100 Micro, Small and Medium Enterprises being among the PLI beneficiaries.

2. India's Climate Action Efforts

2.1 India and Climate Change: Transitioning to the 'Green Economy'

As one of the fastest growing economies of the world and the third largest emitter of greenhouse gases (next only to USA and China), India has a crucial role in the global action on climate change. As per the Economic Survey 2022-23, despite the adverse impacts of Covid-19 on the economy, India has enhanced its climate ambition manifold and embarked on a long-term strategy towards a low GHG emission-based development.

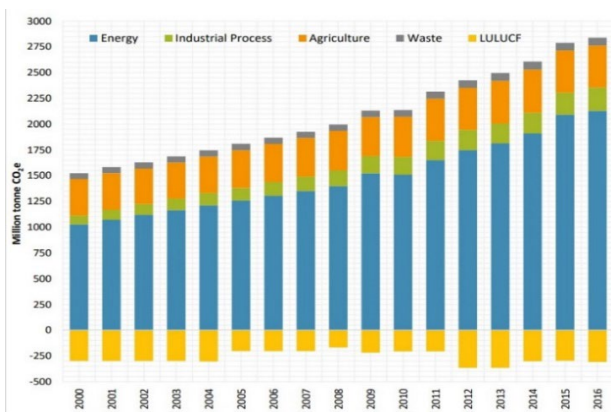


Fig. 2: India GHG inventory (Source: *Third Update Report to UNFCCC*)

- Climate change mitigation and energy transition are now a focus of local, state, and national attention around the world. As a developing country with historically low per capita emission rate, India has emerged as a key player in international negotiations and begun implementing a diverse portfolio of policies, nationally and within individual states, to improve energy efficiency, develop clean sources of energy and prepare for the impacts of climate change.
- India's climate action is focused on increasing the renewables footprint, electrification of public transport vehicular fleets, rolling out 'energy convergence' business models, establishing a

carbon market and use of and transitioning to a hydrogen economy with a commitment to the net-zero emissions goal by 2070, such that India:

- Adopts a climate friendly and a cleaner path than the one followed by other comparable nations.
- Reduces the emissions intensity of its GDP by 45% by 2030 from 2005 level.
- Promotes non-fossil fuel-based energy resources such that it constitutes 50% of cumulative installed capacity by 2030.
- Creates additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030.
- These outcomes linked commitments are a significant step forward for India, having been actively engaged in global environmental protection efforts since the Stockholm Declaration of 1972.

National Solar Mission	•Solar power capacity of 61.62 GW installed by October 2022
National Mission for Enhanced Energy Efficiency	•PAT Cycle-VII notified in October 2021 for energy saving target of 6.63 Million Tonnes of Oil Equivalent (MTOE)
National Mission on Sustainable Habitat	•721 km of metro rail network made operational by August 2022 •62.79 lakh individual household toilets and 6.21 lakh community and public toilets constructed by April 2022
National Mission for a Green India	•₹ 626.96 crore for afforestation targets over an area of 2.1 lakh ha
National Water Mission	•Jal Shakti Abhiyan: Catch The Rain 2022
National Mission on Strategic Knowledge for Climate Change	•Created and strengthened 12 Centres of Excellence for climate change (June 2021)
National Mission for Sustaining Himalayan Ecosystems	•Inter-University Consortium •8 Major R&D Programmes initiated
National Mission for Sustainable Agriculture	•Key targets for FY 2022-2023 covering 0.15 lakh ha under organic farming and 10 lakh ha under micro irrigation

Fig. 3: India's Progress on NAPCC (Source: *Economic Survey 2022-23*)

3. The Push for Renewable Energy and Sustainable Consumption

3.1 Growing Renewables Footprint & Incentives

- An important outcome of India's climate action is the fast growth of renewable power – installed capacity has steadily grown over the past decade to 172 GW⁵, i.e., 40% of the total installed power generating capacity of which 120 GW was established by private sector. India has emerged amongst global leaders in renewables development

⁵ As on 30 April 2023, https://cea.nic.in/wp-content/uploads/installed/2023/04/IC_April_2023.pdf.

aiming to install 500 GW of renewable capacity by 2030.

- Ministry of New and Renewable Energy's recent strategy paper outlines its objective of initiating the development of 37 GW of offshore wind energy capacity which is being rolled out soon⁶.
- Policy and legislative measures at federal and state levels seek to encourage deployment of renewables, including imposition of 'renewable purchase obligations' (mandates for purchasing a certain portion of electricity consumed from renewables), preferential tariffs for renewable energy, encouragement of solar parks, grant of capital subsidies, waiver of statutory/regulatory fees, etc.



3.2 Electric Mobility

- Electric or hybrid vehicles ("e-vehicles") will play a major role in India's strategy to reduce emissions. It is estimated that savings of 846 MT of net CO₂ emissions and oil savings of 474 MTOE are achievable by sales penetration of 30% for private cars, 70% for commercial cars, 40% for buses, and 80% for two or three-wheelers by 2030. Central and state governments have announced a slew of subsidies and other fiscal incentives to promote e-vehicles.
- To reassure investors, various regulatory pronouncements have clarified applicable legal framework. Municipal laws in the States must be aligned to the federal regulatory framework, to promote adoption of e-vehicles and public charging infrastructure.
- Certain issues that must be addressed quickly to help substitute e-mobility for significant size of the internal combustion-based transport market, include:
 - 'range anxiety' (lack of charging infrastructure and the time taken for complete charging);

- high costs (both upfront and lifetime); and
- local peculiarities (appropriate battery technologies with long-lasting throughput suited for India's high temperature).



3.3 Energy Efficiency and Energy Conservation

- Demand Side Management (DSM) and energy efficiency programs rolled out in agriculture, domestic cooking and municipal services converting streetlights has played a major role to:
 - Reduce/ optimize energy demand;
 - Secure energy efficiency; and
 - Optimize investments in generation, transmission and distribution.
- Bureau of Energy Efficiency has initiated a slew of measures with better labelling and certification of products including carbon footprints of products, including:
 - National Programme on Energy Efficiency & Technology Upgradation of MSMEs for manufacturing.
 - Promote energy efficient buildings, establishing star-rating for such buildings.
 - Promote efficient electrical appliances, products, electrical assets such as transformers, e-vehicles.
- Greater emphasis is required for energy conservation measures.
- Smart metering expected to provide better data points to the stakeholders to aid planning for phased replacement and conversion to energy efficient assets.

3.4 Convergence

⁶https://mnre.gov.in/img/documents/uploads/file_f-1657274400252.pdf

- The drivers of the electricity industry today are distinct from those that shaped the market so far. These drivers include:
 - International commitments to decarbonization and energy efficiency.
 - Falling cost of renewable sources of energy and storage – with technological innovations.
 - National commitments to increasing the share of variable renewable electricity.
 - Digitisation of the grid.
 - Growth of e-mobility.
- Energy storage (batteries, pump storage et al) will be vital for achieving India’s climate goals by:
 - Effectively integrating renewable energy (being intermittent in nature) with the grid.
 - Setting up microgrids with diversified loads or stand-alone systems.
 - Addressing peak demand deficits (presently combatted using costly power).
 - Providing other ancillary market services (such as grid support, etc.).
- New business models converging utility services are emerging, threatening to disrupt traditional utilities by providing energy, ancillary services, and energy services in new ways – with manifold economic, environmental, and social benefits over traditional energy only supply business models. With new business models and technologies constantly evolving, there is a need for focus on green financing and establishing regulatory/policy sandboxes to test and poll out new business models.

3.5 Smart Grids and Uniformity in Grid Access

- GoI launched the National Smart Grid Mission to plan, monitor and implement policies and programmes for:
 - Development of smart grids and micro grids.
 - Improved consumer engagement.
 - Capacity-building.
- Smart-grids are expected to improve reliability of the network, transforming to a more consumer centric grid and making it amenable to renewable energy inputs through distributed generation.
- Issues that need to be addressed to ensure efficacious roll-out of smart grids include the high cost of deploying smart grids and the

interoperability of technology components in a utility environment.

- Central Electricity Regulatory Commission (Connectivity and General Network Access to the Inter-State Transmission System) Regulations, 2022 were notified on June 07, 2022, for proper planning of transmission systems. These Regulations aim to provide non-discriminatory open access to the inter-state transmission system to generating companies, through general network access - doing away with the point-to-point access concept to actualize “One Nation, One Grid”.

3.6 The Upsurge in Green Hydrogen⁷

- On January 4, 2023, the GoI approved the National Green Hydrogen Mission with an initial outlay of INR 197,440 million – aimed to make India a hub for production, use and export of Green Hydrogen and its derivatives. Capabilities would be built to produce at least 5 million metric tonnes (MMT) of Green Hydrogen per annum by 2030 through Strategic Interventions for Green Hydrogen Transition Programme (SIGHT) providing:
 - Financial incentive for domestic manufacture of electrolyzers and production of Green Hydrogen.
 - Framework for pilot projects, R&D projects as well as a skill development programme.
- With the aim of advancing the National Green Hydrogen Mission, the Ministry of New and Renewable Energy introduced the ‘Green Hydrogen Standards for India’ on August 18, 2023. The notification of these standards stipulates:
 - Specific emission thresholds that must be satisfied to categorize hydrogen production as ‘Green’, signifying its sourcing from renewable energy, including from energy storage system or banked renewable energy. The ambit of this definition encompasses both electrolysis-based and biomass-based methods of hydrogen production.
 - A comprehensive methodology for quantification, reporting, monitoring, on-site validation, and certification of green hydrogen and its derivatives will be specified by the Ministry of New and Renewable Energy.
 - The Bureau of Energy Efficiency will be the nodal authority for accrediting agencies involved in overseeing the monitoring,

⁷ ‘Green hydrogen’ produced using renewable sources has immense potential to replace feedstocks derived from fossil fuels and consumed in refineries, ammonia production, steel manufacturing,

mobility sector etc. It would have an important role in transitioning and sustaining low-carbon economy.

verification, and certification of green hydrogen production projects.

- Further Green Hydrogen Policy sets out various incentives to promote the green hydrogen industry:
 - Waiver of ISTS charges for 25 years for projects commissioned till December 31, 2030.
 - Land in RE parks to be allotted for hydrogen projects.
 - Renewable Purchase Obligation obligations may be met by purchasing green hydrogen.
 - Cross subsidy surcharge and additional surcharge not applicable for production of green hydrogen.
- Green hydrogen production will speed up industrial decarbonization and reduce over 3.6 gigatonnes CO₂ emissions by 2050.
- GoI plans to launch a special production linked incentive scheme to set up a manufacturing base for electrolysers and other green hydrogen equipment to encourage economic growth and global partnership with the objective of reducing import dependence and costs.
- Green hydrogen is also important element of India's Long term Low Emissions Development Strategy submitted on November 14, 2022 at COP 27.



3.7 Carbon Capture and Storage⁸

The Ministry of Petroleum and Natural Gas has initiated efforts to provide opportunities for collaboration and knowledge sharing to the industry and prepare a unified and practical strategy for development and implementation of CCS techniques in the oil and gas sector in India. A task force to this effect is working to prepare the '2030 Roadmap for CCUS'.

⁸ Carbon capture and storage ('CCS') aims to reduce greenhouse gas emissions from power plants and other industrial sources by capturing carbon dioxide and storing it underground. CCS is crucial to reduce emissions from fossil fuel-based power generation besides

3.8 Enhanced Focus on Natural Gas – the Transition Fuel

- With net zero emission targets and shift to clean fuels, natural gas is now increasingly viewed as a bridge fuel. GoI is targeting to increase the share of natural gas in the energy mix to 15% by 2030 from the current 6.3% with various initiatives, i.e.:
 - Expanding National Gas Grid to ~33,500 km from current ~21,000 km.
 - Expanding the City Gas Distribution (CGD) network – after completion of the current 11A CGD round, there will be 295 geographical areas covering 98% of the country's population.
 - Building Liquefied Natural Gas (LNG) Terminals to secure availability of gas in all demand areas – from 6 operational regassification terminals (5 LNG terminals are under construction).
 - Allocating domestic gas to Compressed Natural Gas (CNG) (Transport) / Piped Natural Gas (Domestic) such that allocated quantities of domestic gas would be fully supplied (no cut category).
 - Marketing and pricing freedom qua gas produced from various fields including those awarded under Hydrocarbon Exploration Licensing Policy, high pressure/high temperature areas, deep water & ultra-deep water and from coal bed methane.
- In 2021, GoI issued the draft LNG Policy which inter alia aims to create a regassification capacity of 70 MMTPA by 2030 (from current ~43 MMTPA capacity), virtual pipeline infrastructure, establish LNG station and enhance the use of LNG as a transport fuel.
- Gas-based power has faced several challenges (like high cost and sourcing issues) leading to idling of installed capacity in India. Recent rise in demand leading to procurement of 'round the clock' power, blending is permitted with any non-renewable sources of power (including gas) from plants that are partly/fully commissioned or are under construction at the time of issuance of bids. This has given the gas sector a fillip and is expected to address the issues of intermittency, limited hours of supply and low-capacity utilisation of transmission infrastructure.
- It is advisable to procure power from gas-based power plants to meet peak deficits.

decarbonizing industrial processes such as cement and steel production. India.

3.9 Gradual shift to Alternate Fuels

- Shifting from conventional carbon-emitting fuels to alternate clean fuels is another prominent move towards decarbonization.
 - GoI has notified the use of hydrogen as automotive fuel for fuel cell vehicles and to support research in various aspects of renewable energy including hydrogen-based transportation and fuel cell development.
 - National Policy on Biofuels (2018) sought to enhance biofuels availability in the market by increasing blending. This Policy was expanded in September 2022 by an "Innovation Roadmap of the Mission Integrated Biorefineries" for building the biofuel markets. In December 2022 an International Biofuel Alliance was announced to fund initiatives to expand use of biofuels et al.
 - Efforts are underway to bring options such as bio-CNG, biodiesel, ethanol (through blending) to the pool. Oil Marketing Companies are targeting to install about 22,000 retail outlets for alternate fuel stations (EV charging/ CNG/ LPG/ LNG/ CBG etc.) by May 2024.
 - Efforts are being made to increase the use of biofuels made from sugarcane, cereals, and agricultural waste and reducing the reliance on crude oil; provide alternative sources of sustainable energy; and facilitate trade between the biggest producers and consumers of biofuels.
 - Under the Ethanol Blended Petrol (EBP) Programme, an indicative target of 20% blending of ethanol in petrol by 2025 has been laid out. The Cabinet Committee on Economic Affairs, GoI approved higher prices for ethanol derived from sugarcane based raw materials in November 2022. The public sector Oil Marketing Companies (OMCs) have achieved over 10% ethanol blending in petrol during 2021-22. A "Roadmap for ethanol blending in India 2020-25" was released to further these numbers.
 - The Government of India intends to ramp up nuclear power production in a bid to increase renewable energy production and meet climate change goals. Nuclear energy is a key substitute for delivering base load power free of intermittency in place of fossil fuel energy. The focus is on use of Small Modular Reactors (SMRs), which that are smaller and cost less. Government is exploring participation of private sector, including startups, for the development of this critical technology within India. Technology and finance are crucial to ensure commercial availability of SMRs.

4. The Challenges Ahead

In actualizing the proposed push for renewable energy, decarbonisation and sustainable development, certain hurdles and challenge, must be resolved in a time-bound manner through legislative, policy and regulatory interventions, viz.:

- Difficulties in obtaining land and right of way for projects (with attendant issue of converting the permitted usage of such land).
- Availability of viable finance ('show me the money!').
- Evacuation constraints (which lead to 'idling' of capacity).
- Limitations of capacity (institutional and structural bottlenecks) manifesting in issues like unpredictability in conduct of auctions and their outcome, besides re-opening of contracts.
- Non-compliance with the renewable purchase obligations.
- Fair allocation and mitigation of risk (balancing welfare and viability; dealing with unforeseen risks).
- Need to speedily resolve disputes that stymie development efforts.
- Resistance from certain stakeholders to deployment of solar rooftop installations.
- Low competitively discovered tariffs have made the industry susceptible to market changes.



4.1 Challenges in Financing

- The past decade witnessed distressed borrowers defaulting in servicing loans from state-run banks to fund infrastructure due to the 'twin balance sheet problem' plaguing corporates and banks, which threatened to spread to non-banking financial companies and real estate companies.

“As investments made by companies went sour, it impaired their ability to repay bank loans. Hence, banks’ non-performing assets began to rise. That set in motion a long period of repair of the financial and non-financial sector balance sheets in the second half of the last decade.”

Economic Survey for FY 2022-23

- Availability of long-term low-cost finance is vital for scaling up infrastructure. The Indian banking sector has done well to control and reduce the stress caused by multiple non-performing assets which resulted in a liquidity crunch and limited availability of credit.
- Indian infrastructure was constrained by factors that made financing infrastructure costly, viz.:
 - Front-loading debt repayment – debt ordinarily becomes repayable within 8–10 years as compared to a 25–30-year revenue generating life of an infrastructure asset.
 - Absence of a secondary debt market covering entities other than banks like insurance, pension and mutual fund companies results in capital being stranded, and limits refinancing options. Such a market would lead to “lower cost of capital, greater credit availability”.
 - Time and cost overruns due to delays in acquiring requisite access to land (right of way issues) and permits and clearances heighten risk perceptions.
 - Prolonged disputes involved non-payment of dues, reopening of contracts *et. al.*
- These imperatives will drive deepening of financial markets to overcome constraints of traditional debt-heavy capital structures. Bonds being liquid instruments, facilitate the participation of long-term institutional investors such as pension and insurance funds. Blended financing using a combination of different sources of funding can leverage strengths of each funding source.
- Structural reforms can help transition from infrastructure deployment models with heavy public spending in EPC and HAM models to a revival of public private partnerships with greater focus on private sector participation. Procurement innovation can mitigate risk of unsustainable tariffs/ bids which threaten the financial viability of a project.

“The government responded with several measures to stem the fallout of the collapse of IL&FS and housing finance companies, including a corporate tax cut in September 2019. Soon thereafter, the pandemic struck, and the government had to address the emerging health, social and economic consequences of unprecedented nature. These have been discussed in detail in the previous two economic surveys of 2020-21 and 2021-22. **These back-to-back shocks have delayed the impact of such momentous reforms on the economic growth.**”

Economic Survey for FY 2022-23

4.2. Capacity Constraints

- The NIP envisages a significant role for “a deep pool of experienced private developers with required competence and execution capacity” to meet the infrastructure goals. The NIP acknowledges dearth of private players and inadequate capacity in public institutions to effectively and efficiently conceptualize, plan, prepare, complete, deliver and operate infrastructure projects.
- There is a need to project procurement structures, contract governance mechanisms, strengthen project management and monitoring capabilities of public institutions.
- Often planned and budgeted capital expenditure going unspent. GoI anticipates saving about INR 800,000 million (US\$ 9812.66 million approximately) in FY 23 due to underutilisation of allocated funds by various ministries and departments.

4.3. Welfare vs. Viability

- For infrastructure creation to be viable and attractive for private sector, equity invested must earn a reasonable rate of return. Delays, disputes and withholding payments by public entities are a matter of concern for investors which must be addressed.
- The challenge for Indian infrastructure regulation is to serve welfare though means that are economically viable in order to attract investment and secure affordable supply of facilities.



4.4. Risk Allocation and Mitigation

- Infrastructure projects involve long-term arrangements which cannot cover all situations/ eventualities during a project's lifetime. Projects can come inherently under stress due to risks not foreseen or addressed in the underlying contractual arrangements, giving rise to the need to renegotiate/ rebalance the contract.
- This aspect was the focus of the work awarded the 2016 Nobel Prize for Economics⁹ –

"[A] new branch of contract theory that deals with the important case of incomplete contracts. Because it is impossible for a contract to specify every eventuality, this branch of the theory spells out optimal allocations of control rights: which party to the contract should be entitled to make decisions in which circumstances?"

- Currently, infrastructure contracts have limited flexibility in contract rebalancing giving rise to enforceability and expropriation risks. Indian infrastructure has witnessed several projects severely affected by such unforeseen events (like the Coal India and the Indonesian coal issue in power generation, highway projects plagued by land, environment and other clearance delays).

4.5. Dispute Resolution & Cashflow Crunch

- Such issues inevitably lead to disputes, delays and cost inefficiencies in infrastructure delivery. The infrastructure development comes at high cost of delays (true value of money).
- Disputes and withholding of payments create cashflow problems such that incurred costs are not recovered by cash-strapped developers who are then unable to service debt. Even arbitral awards in favour of contractors are thwarted in series of court proceedings by public agencies which mean that

funds are not immediately and entirely forthcoming.

- Even where the resolution mechanism contemplates reference to binding arbitration, frequent recourse to the courts have stymied time-bound resolution. One of the key constraints to 'Ease of Doing Business' in India has been the inability to enforce contracts and resolve disputes.
- Renegotiation to resolve issues in a timely fashion through expert intervention (mediation, conciliation or fast track adjudication) can be a positive instrument to address the inherently incomplete nature of infrastructure contracts and enhance welfare. Though attempts were made to evolve it, such a framework is yet to be given effect to.
- There have been few initiatives towards establishing dedicated bodies/institutions for resolving sectoral disputes through non-judicial/non-regulatory means (e.g., SAROD for the highways sector, and more recently for scheme-based competitively procured renewable energy projects) with the view to streamlining and facilitating speedier dispute resolution. There is a need to effectively replicate the same across sectors to reduce the pendency of disputes.
- The 2018 Amendment to the Specific Relief Act, providing for fast-track resolution by special courts empowered to avail of expert testimony and not injuncting construction and operation of infrastructure projects, is yet to be effectively implemented across all states.
- Infrastructure in some sectors is affected by entities exercising dual function of market participant and market regulator (e.g., National Highways Authority of India, Indian Railways, Airports Authority of India, etc.). This dislodges the level playing field.
- GoI undertook several reforms to streamline doing business in India and reduce litigation delays. Some such initiatives, include barring of dual litigation across fora over the same issue in areas of taxation, proposals to setup an International Arbitration Centre for timely settlement of disputes under international jurisprudence as well as reduction of over 25,000 compliances and repeal of 1486 Union laws to streamline processes. This remains work in progress.

4.6. State Level Issues - Contract Sanctity & Lack of Project Trajectory

⁹<https://www.nobelprize.org/prizes/economic-sciences/2016/press-release/>.

- The need to improve certainty and business trajectory for implementation of projects cannot be overstated. Since unforeseen changes will continue to impact energy and infrastructure projects, it is important to have contract sanctity with flexibility to address unforeseen changes.
- A robust contract enforcement mechanism based on viable risk allocation with emphasis on time value for money should form the bedrock for implementing projects at the federal and state levels (whether under power purchase agreements, concession agreements or others).



4.7. Water, Climate change and Sustainability

- The Intergovernmental Panel on Climate Change's 6th Assessment Report issued in March, 2023 highlights the widespread and severe impact of climate change on people and ecosystems. It underscored the heightened risks of further warming with end of century warming expected to be between 2.7^o to 3^o. The report offers hope in the form of adaptation measures for building resilience, but requires greater finance to scale solutions.
- Deterioration of our natural environment occurred over decades of industrialization and urbanization without mitigation of pollution of our water, air and land. India is amongst the most vulnerable countries to climate change with:
 - Over 50% of the population dependent upon agriculture and other climate sensitive sectors.
 - 12% of India is flood prone.
 - 16% is drought prone.
 - India is the third largest emitter of greenhouse gases in the world after China and United States.
- Recent Government announcements showcase unprecedented work done by India in areas of

¹⁰Adoption of cloud computing, IT/OT convergence, IoT and IIoT automation, AI/ML, blockchain, quantum computing, AR/VR, and digital twins.

inland waterways, tourism, water security and Water Vision @ 2047.



4.8. Cybersecurity & Digital Transformation

- Artificial intelligence (AI), internet-of-things (IoT), robotics, fintech, etc., have the potential to transform very facet of our daily lives, from homes to offices to markets to education to logistics to manufacturing. Digital transformation¹⁰ picked up pace due to the pandemic¹¹ bringing along a wide array of advanced cyber threats, malware and ransomware. With the advent of new technologies like UPI, digital Aadhaar, Co-WIN and e-RUPI, India is witnessing new regulatory challenges.
- India ranks amongst the top 10 spam sending countries and amongst the top 5 countries affected by cyber-crime. GoI along with DSCI and NASSCOM has constituted a Task force to build a trained base of 1 million certified and skilled cyber security professionals and create 100+ successful Indian security product companies. The goal is to equip India to tackle cyber security issues and be a global leader in the cyber security space by 2025¹².
- The Parliament of India has passed the Digital Personal Data Protection Act, 2022 ("DPDP"). The DPDP provides for the processing of digital personal data in a manner that recognises both the right of individuals to protect their personal data and the need to process such personal data for lawful purposes. The DPDP regulates processing of personal data which is in digital form. Notably: -
 - The DPDP does not expressly apply to profiling of data, and references to "profiling". This omission may have interesting implications, particularly for processing activities that are not

¹¹https://www.dsci.in/sites/default/files/documents/resource_centre/India%20Cybersecurity%20Industry.pdf, acknowledged by a Data Security Council of India (DSCI) study.

¹²<https://www.dsci.in/content/cyber-security/cyber-security-task-force>.

directly in conjunction with the sale of goods or services in India.

- The DPDP entirely excludes non-automated processing from its scope. This is in contrasted with the General Data Protection Regulation (GDPR), which extends to non-automated processing of personal data in specified scenarios.
- The DPDP replaces the concept of “Deemed Consent” (where consent would be “deemed” to have been given) with the narrower concept of “Legitimate Uses”.
- One of the key elements of India's future economic growth story will be how its physical and digital infrastructure work together.

5. Way Forward

5.1 Structural Reform in Power Markets

- The electricity market had been dominated by state-owned vertically integrated electricity boards that were responsible for generation, transmission, and distribution of power. The market has witnessed a steady shift away from public sector dominance towards increased competition and private sector participation, with power exchanges and innovative forwards, futures and derivative markets under the oversight of independent expert regulators.
- Distribution continues to be dominated by the public sector such that the major purchaser of power generated by the private sector continues to be State. The poor payment record of off-taking utilities continues to hamper the industry. Bankability and viability of distribution is constrained owing to problems of operational inefficiencies, liquidity, financial solvency, delayed payments by state owned enterprises and regulatory uncertainty.
- Generating companies were compelled to make payments to their vendors and sub-vendors but face a liquidity crunch owing to non-payment by buying utility. Due to recent reforms (Late Payment Surcharge Rules, 2022) there is a 52% drop in these outstanding dues (i.e., dues as on December 2022 stood at INR 1,080,920 million¹³, which is now reduced to INR 571,750 million as on January 30, 2023)¹⁴ owed by overdue payments owed by State Discoms to Generators remedying the negative perception of the risk and threat of default. The Rules fix the base rate of LPSC at SBI's marginal cost of funds-based lending for 1 year plus 5%, providing for a staggered increase in the rate of

LPSC at 0.5% per month of delay, subject to a limit of 3% over the base rate or the rate specified in the PPA. In case of default access to the grid may be curtailed for a state.

- On May 29, 2023 a revised and updated Indian Electricity Grid Code has been notified to provide high voltage backbone system of interconnected transmission lines, sub-stations and generating plants with effective real time operations.
- Serious initiatives are afoot including creation of separate offtake/ purchase vehicles, as also separation of carriage and content. Certain amendments to the Electricity Act, 2003 (the apex law governing the sector) proposed by way of the Electricity (Amendment) Bill envisage:
 - Allowance for multiple distribution licensees to operate in the same area of supply, with licensees required to provide non-discriminatory open access to their network.
 - Higher penalties for non-compliance with renewable purchase obligations.
 - Making adequate security of payment a condition-precedent for scheduling power supply.
 - Empowering electricity regulatory commissions to adjudicate disputes relating to performance of obligations under contracts for sale of power.

The fate of these proposals is uncertain due to a brewing turf battle between the federal government and state governments in terms of regulatory oversight risking any immediate passage in Parliament.



5.2. Increase in Exploration & Production of Oil & Gas

- While recognizing the significance of decarbonization in the sector including in energy sourcing, the GoI also acknowledges that increase in exploration and production (E&P) activities is

¹³<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1885116>

¹⁴ <http://praapti.in/>

paramount for ensuring energy security and energy independence. India is the third-largest consumer and importer of oil in the world and attempts are being made to increase domestic production, so as to lessen its dependency on expensive imports. India imports 85% of its crude oil, and about 50% of its natural gas requirements.

- GoI aims to increase the acreage to 0.5 million square kilometer by 2025 and 1.0 million square kilometer by 2030 (from the current acreage of ~0.25 million square kilometer). By 2023, India is likely to invest \$58 billion in the exploration and production of its oil and gas reserves. Major international energy companies have evinced interest in making investments and have been engaging with the National Oil Companies to seek policy reforms in the sector including clear protection against expropriation, neutral arbitration, and globally competitive returns for the duration of the contract. Instead of merely investing in a producing field or expanding an existing discovery, the goal is to make significant discoveries in India.
- For boosting participation/ investment in E&P, GoI has introduced several initiatives like:
 - Open Acreage Licensing Policy (based on aspects of revenue sharing model, marketing and pricing freedom, freedom to carve out blocks through expression of interest etc.,) under the Hydrocarbon Exploration and Licensing Policy.
 - Reforms in Hydrocarbon Exploration and Licensing Policy for enhancing domestic exploration and production in 2019 (categorizing basins and benefits for basins with contingent/ prospective resources such as no revenue sharing, royalty concessions for early production etc.).
 - Discovered Small Field Policy for early monetization of unmonetized discoveries of National Oil Companies.
 - Natural Gas Marketing Reforms, 2020 (which includes reforms such as sale through e-bidding platform, and providing marketing freedom for certain fields).
 - Other policies to promote and incentivize enhanced recovery methods for Oil and Gas, development of marginal fields, etc.
- The 'No Go' areas have been reduced by 99% by opening of 0.91 million square kilometer of acreage. The Offshore Bid Round (OALP Bid Round-IX) has also been launched whereby 26 Blocks spread over 9 Sedimentary Basins, covering an area of 2,23,031.4 square kilometer are on offer. Further, there are plans to develop a cloud-based, artificial intelligence and machine learning powered National Data Repository for advancement of E&P data management.
- In the upstream industry, India is in competition with several other nations due to a wider worldwide shift in capital spending from the oil and gas sector to renewables. The country's dependence on imports has increased due to a combination of fast expanding domestic consumption and declining crude production, which has made policy reforms during the past several years ineffective at luring foreign investments to the Indian upstream. Increasing the use of alternative energy sources like biofuels, ethanol, and compressed biogas, diversifying the supply chain, focusing on local production while expanding exploration and production, and using EVs and hydrogen to satisfy energy requirements makes it simple to replicate our individual energy security objectives.

5.3 Carbon Market

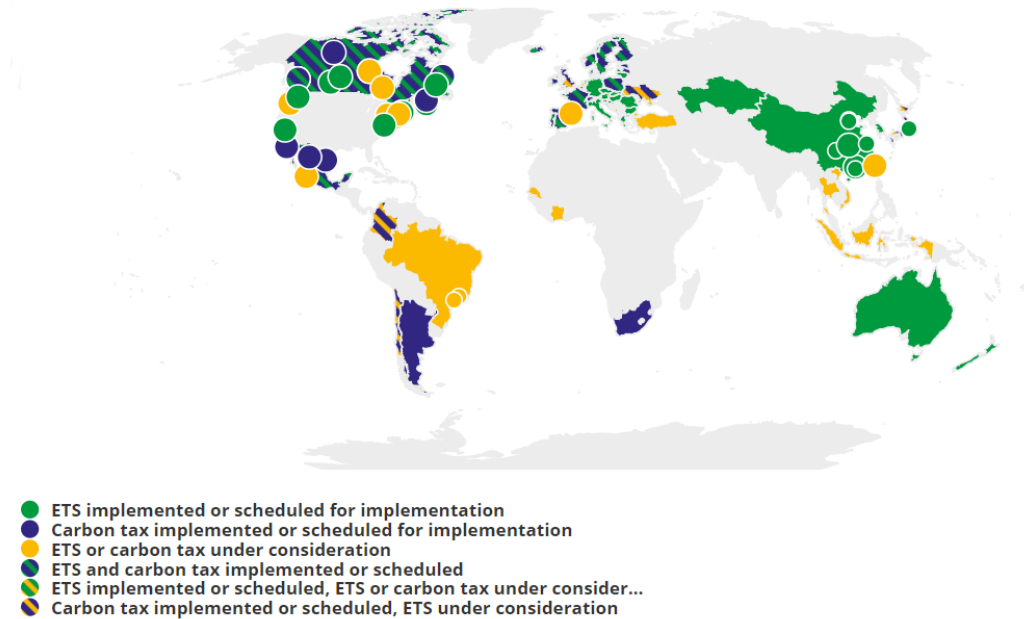


Fig. 3: Map of Carbon Pricing Initiatives (Source: [World Bank](#))

- The Energy Conservation (Amendment) Act, 2022 has been enforced on January 01, 2023, which envisages:
 - Establishing a carbon credit trading scheme (market for reduction of carbon emissions) with:
 - An authorised agency issuing carbon credit certificate to any compliant entity registered.
 - Registered entities will be entitled to purchase or sell carbon trading certificate.
 - Any other person may also purchase a carbon credit certificate on a voluntary basis.
 - Specifying minimum consumption of energy from non-fossil sources by classes of designated consumers (i.e., mining, steel, cement, textile, chemicals, and petrochemicals, transport sector including railways, and specified commercial buildings). Carbon market is anticipated to be a lynchpin of India’s climate action and decarbonisation efforts as a tool to incubate and encourage sustainable behaviour and the creation of a market for green credits.
 - In this regard, the proposed carbon market marks a watershed which may help monetise credits in international markets besides stemming the outflow of Indian credits to international markets at low value.
- Pursuant to the Energy Conservation (Amendment) Act, 2022, the Government of India has issued the 'Carbon Credit Trading Scheme, 2023' on June 28, 2023, granting its approval for the establishment of the first regulated carbon market in India. This scheme stipulates both a voluntary and a compliance carbon market in India. Some key elements set out in the scheme are as follows:
 - It necessitates the establishment of key entities, including the National Steering Committee, the technical committees, and the Accredited Carbon Verification Agency.
 - A National Steering Committee will be established for the Indian carbon market to oversee and govern the operations of the market. The functions of the committee include recommending the formulation and finalization of procedures, rules, and regulations for the Indian carbon market.
 - The Bureau, as the designated administrator for the Indian carbon market, will be required to undertake functions such as (a) identifying sectors with potential for greenhouse gas emissions reduction and recommend their inclusion in the Indian carbon market to the Ministry of Power; (b) developing trajectory and targets for entities under the compliance mechanism; (c) issuing carbon credit certificates based on the National Steering Committee's recommendation and subsequent approval by the central government; (d) determining fees and charges payable by registered entities, with Central Government approval, to cover implementation costs; (e) developing and maintaining the necessary IT infrastructure, including user guidance platforms.

- Further, the Central Electricity Regulatory Commission will act as the regulatory authority for the carbon market and will carry out functions such as (a) registering power exchanges and granting approval for the trading of carbon credit certificates; (b) regulating frequency of carbon credit certificates trading (c) providing market oversight and taking necessary preventive and corrective actions to prevent fraud or mistrust; et al.
 - The Grid Controller of India has been designated as the official registry responsible for overseeing the Indian carbon market. They will be responsible inter alia for (a) complying with directives issued by the Bureau; (b) registering obligated and non-obligated entities; (c) maintaining a secure database with robust security protocols; (d) sharing transaction records with the power exchange and Bureau; (d) assisting in the development of an information technology platform for maintaining the carbon credit certificates database.
 - The determination of sectors and obligated entities falling under the compliance mechanism will be made by the Ministry of Power. The Ministry of Power will propose the notification of greenhouse gas emission intensity targets to the Ministry of Environment, Forest and Climate Change for official notification under the Environment Protection Act, 1986.
 - Obligated entities are required to attain greenhouse gas emission intensity levels in accordance with the targets notified by the Ministry of Environment, Forest and Climate Change.
 - Carbon credit certificates will be issued to obligated entities that exceed the greenhouse gas emission intensity targets established for them.
 - Obligated entities that fail to achieve the targeted reduction in greenhouse gas emission intensity must compensate for the shortfall by procuring carbon credit certificates from the Indian carbon market.
- Issuance of Carbon Credit Trading Scheme, 2023 for establishment of a carbon market in India, both voluntary and compliance.
 - Effective pricing mechanisms and adequacy of emissions cap are key to ensuring credits have marketable/tradeable value.
 - Draft Green Credit Programme Implementation Rules, 2023 issued for promotion of and incentivizing voluntary environmental actions.
 - With discouraging track-record of implementing norms, enforcement will be key.
- Success of the Indian carbon market will depend upon underlying accreditation, validation and pricing mechanisms so as to ensure liquidity and robustness. Experience from the European Union suggests that a loose emissions cap can effectively devalue carbon credits, undermining the efficacy and goals of the system.
 - In addition to the Carbon Credit Trading Scheme, on June 26, 2023, the Ministry of Environment, Forest and Climate Change issued the draft Green Credit Programme Implementation Rules, 2023 to introduce the Green Credit Programme to promote a market-based approach for green credits thereby incentivising voluntary environmental actions by various stakeholders.
 - The said draft rules introduce the notion of Green Credits, which are defined as individual units of incentives granted for specific activities that yield a positive environmental impact.
 - These draft rules outline several sectors, including tree planting, water conservation, sustainable agriculture, waste management, air pollution reduction, mangrove preservation and restoration, eco-labeling, and sustainable construction and infrastructure, as activities capable of generating Green Credits.
 - The Green Credit program will be rolled out gradually, with the initial phase focusing on the design and pilot of the program involving only two or three of the identified activities.
 - To fulfill the program's goals, the draft rules envision the establishment of a Steering Committee, a Green Credit Program Administrator, and Technical Committees.

The efficacy of these measures will hinge on their design, implementation and enforcement.



5.4 Cross-Border Trade

- Efforts have been steadily underway to usher in a south Asian energy market, with electricity being traded on a bilateral between India and Nepal, India and Bhutan and India and Bangladesh by means of cross-border transmission links. The legal and regulatory framework in this regard was recently overhauled in India, with detailed regulatory and procedural prescriptions in place. Bhutan and Nepal have also commenced trading on India's electricity exchanges.
- The growth of cross-border electricity trade has been and is expected to be driven by a combination of factors, including meeting increasing demand of electricity on account of growing populations and/or economies (e.g., Nepal and Bangladesh), earning revenue by exporting surplus generation capacity (e.g., Bhutan, Nepal and India), addressing sustainability concerns and mitigate climate change (e.g., India and Bangladesh) and harnessing seasonal complementarities (e.g., wet season surpluses and dry season deficits).
- Arrangements for importing and exporting of electricity with neighboring countries, including Nepal, Bhutan and Bangladesh, would enable meeting the requirement of power in the respective countries thereby moving towards greater energy security in the region. The trade has been growing rapidly in the last decade and was about 18 BUs (as of October 2021).

5.4 Offshore Wind

- Pursuant to Cabinet approval dated September 09, 2015, the Ministry of New and Renewable Energy, Government notified the 'National Offshore Wind Energy Policy' on October 06, 2015. It establishes the basic framework for developing the offshore wind sector in India to actualize the National Action Plan on Climate Change - providing a conducive environment to harness offshore wind energy in India; overcoming existing barriers; and creating technological and implementation capabilities within India.
- National Institute of Wind Energy has issued Guidelines for Offshore Wind Power Assessment Studies setting out qualification requirement,

application process, and other rights and obligations of the private developer for carrying out studies and surveys for offshore wind.

- Ministry of New and Renewable Energy is set to issue a set of rules to regulate the leasing mechanism of offshore blocks.
- Based on the preliminary assessment carried out by National Institute of Wind Energy, MNRE has identified eight zones each off the coast of Gujarat and Tamil Nadu as potential offshore wind energy zones. Based on meso scale mapping, an estimated 36 GW offshore wind power potential exists off the coast of Gujarat and 31 GW offshore wind power potential exists off the coast of Tamil Nadu.
- Ministry of New and Renewable Energy is working to finalise various bidding strategies and project implementation models for developing offshore wind projects in the country. The first round of tendering expected to commence in coming weeks.

5.5. Investments and Fiscal Incentives

- Indian infrastructure development has traditionally been primarily funded by public finance till it was opened to private investments in 1990s. To cushion the impact on the economy during the pandemic, public investment stepped up considerably.
- There is an urgent need to augment private capital participation. NIP and NMP recognize the need for private capital, domestic and international as being pivotal in the growth trajectory for the infrastructure. GoI has taken a series of steps to attract this healthy mix of capital in infrastructure.
- There is a need to alleviate some key hurdles like higher costs (including time and cost overruns), lower revenues and greater financing costs, including the impact of adverse foreign exchange rate variation on debts, which squeeze corporate cash flow leading to debt servicing problems. The upsurge in foreign direct investment is focused on brownfield operating assets rather than new greenfield investments. Public investment needs to be supported ably by private investment and possible upscaling of PPPs in roads, transmission, rail, renewables, airports, urban infrastructure, telecom to reach the ambitious target set in the Budget.
- In the recent Budget, liberal tax concessions were extended to sovereign and pension funds investing in the infrastructure sector which is poised to have a positive impact on launching InVITs with a renewed vigour for both public and private sector players.
- The fiscal incentives need to be managed with the right mix of public, private and PPP models for efficient asset monetisation coupled with structural

reforms. Capacity creation should be encouraged with new policies and incentives coupled with measures to resolve regulatory bottlenecks – ensure greater transparency and accountability, ease land acquisition norms, streamline consents and clearances and ensure reasonable return on investment.

- The National Investment and Infrastructure Fund ('NIIIF'), a sovereign-backed, independently managed fund seeking to leverage sovereign wealth funds, foreign institutional investors, pension funds and commercial institutional capital for investments in India's infrastructure. With a seed investment of \$3 billion by the GoI, NIIIF is expected to become a channel for supporting public-private capital, domestic-international capital and promote the infrastructure sector.

5.6. Structured Disinvestments of Prized PSUs & Public Asset Monetization

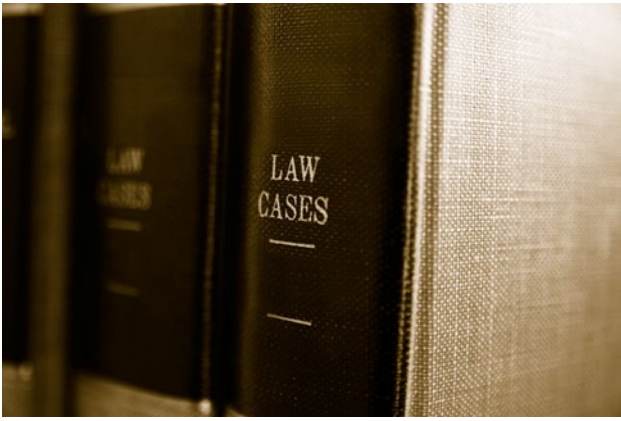
- Infrastructure creation requires significant upfront capital investments with long gestation periods and regulated returns. Its operation also requires a steady working capital.
- Disinvestment of PSUs will provide such resources to be invested in infrastructure projects and provide much needed liquidity to the economy. Some of these PSUs are working inefficiently and incurring recurring losses. Public sector disinvestment will enable these enterprises to attract private foreign investment in setting up joint ventures. Capital inflow through private direct foreign investment is better than that procured through foreign aid or commercial borrowing from abroad.
- NMP is predicated on a structured disinvestment program of some of the prized PSUs for the greater good of the economy – such as Bharat Petroleum Corporation Limited, Shipping Corporation of India, Air India, Bharat Heavy Electricals Limited to name a few (some of which are already underway or under active consideration). Most of these PSUs possess large scale logistical infrastructure but are often marred by inefficient management and state-controlled bias. Efforts must be made to reduce the governmental stake in entities that play a pivotal role in infrastructure.
- The disinvestment target of INR 65,000 crore (US\$ 8 bn) for the FY 2022-23, it seems to have fallen short of achieving this target. With proper incentives and structural reforms including policy decisions, disinvestment in PSUs can catapult the Indian infrastructure growth by leaps and bounds. Such disinvestment can be achieved effectively if it is backed by proper timeframes prescribed for completion of the disinvestment process,

government's support to increase the efficiency of non-performing/ loss making PSUs and increasing investor confidence.



5.7. Regular Payments by State owned Enterprises

- Delayed payments by state owned enterprises have posed a teething problem in the development of the infrastructure sector. The significant delays in payments to vendors/ suppliers for various reasons such as delays in certification of bills, delays in settling changes-in-scope even after supplies/ services are made/ rendered, and even delays in payment after certification of bills. At times bank guarantees (advance/ performance/ retention) which are not returned in a timely manner.
- To restrict such delays in payments, the GoI has introduced certain measures like advance payments in power sector by distribution companies for procuring power from generating companies. Such measures have helped in de-risking revenue uncertainty of infrastructure projects while giving credible exit options to secure investors from expropriation risk.
- Additionally, to tide over the liquidity problems of the power sector, exacerbated by the outbreak of COVID-19, the GoI announced a Liquidity Infusion Scheme as part of Atmanirbhar Bharat Abhiyan. Under this intervention, Rural Electrification Corporation and Power Finance Corporation are extending special long term transition loans to Discoms for liquidating outstanding dues of Central Gencos, Transcos, IPPs and RE Gencos. The disbursement under the long-term transition loans have been linked with discoms undertaking certain reform measures such as installing pre-paid smart meters, as well as laying down the trajectory for preventing AT& C losses, ACS-ARR gaps, recovery of subsidy and Government dues.



5.8. Timely Dispute Resolution

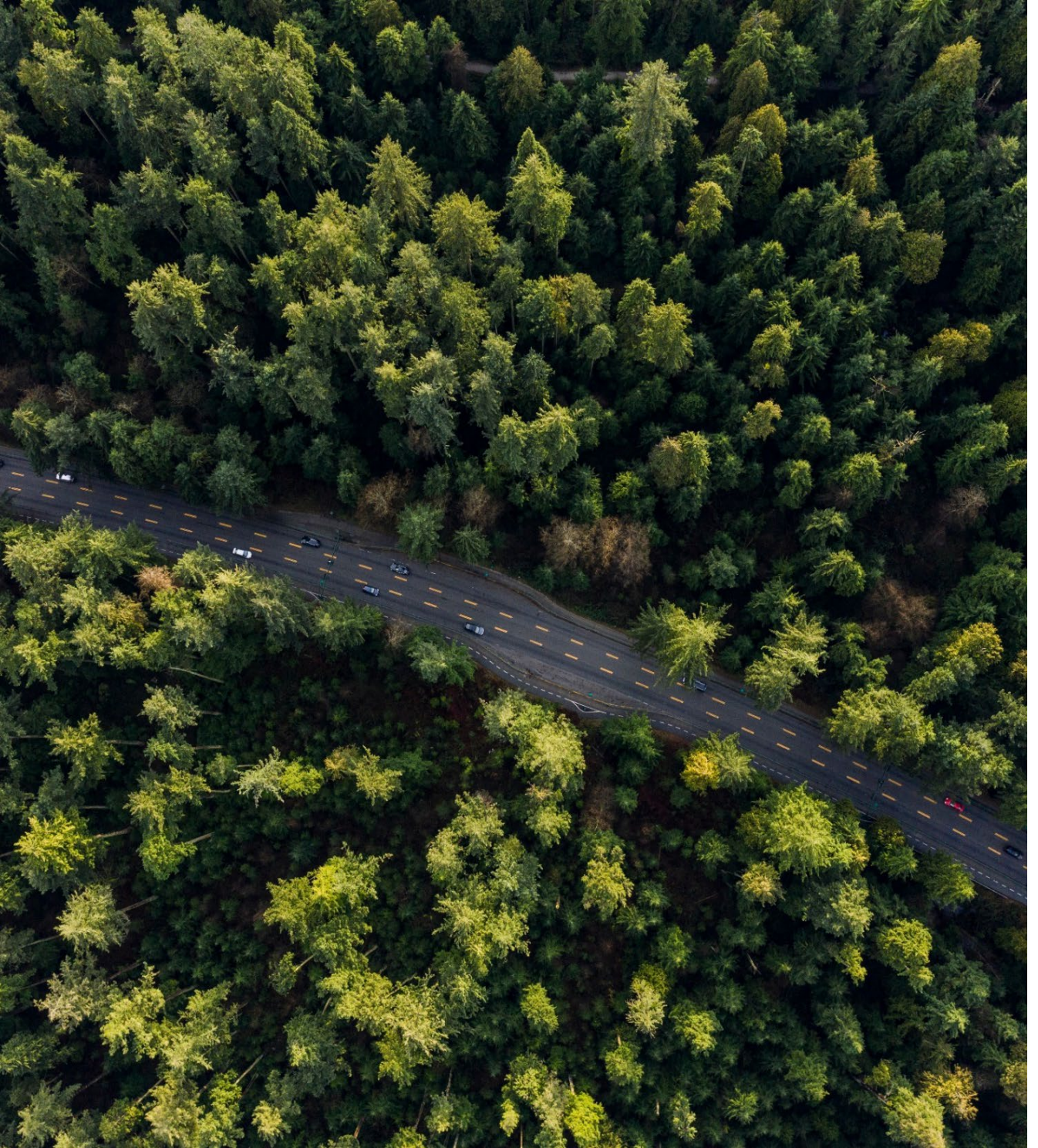
- There is an urgent need to fast track and strengthen dispute resolution in infrastructure projects by creating quasi-judicial authorities to ensure contractual sanctity for investors. Infrastructure projects are long term projects and often face disputes at every stage of progress. Such disputes are relatable to land acquisition, right of way issues, EPC contracts, environmental issues, time and cost overruns, supplier defaults and delays, unforeseen events / accidents, IBC, and mismatch with regulatory lag.
- India has witnessed significant structural reforms for infrastructure in the past 8 years:
 - Recognizing the twin balance sheet problem plaguing investment flows and the accumulation of stressed and bad loans (non-performing assets or NPAs):
 - The Insolvency & Bankruptcy Code, 2016 was enacted for time-bound debt resolution and bankruptcy process focusing on salvaging capital and time value of money.
 - In December 2019, provisions for insolvency resolution and liquidation for individual insolvency were notified concerning personal guarantors (“PG”) to corporate persons.
 - In November 2019 a specialised framework was notified under the Code for the financial service providers.
 - In April 2021 an additional framework for pre-packaged insolvency resolution for MSMEs was established.
 - In January 2023 Ministry of Corporate Affairs is engaging in public consultation for amendments to the Code in relation to the “admission of corporate insolvency resolution process (“CIRP”) applications, streamlining of the insolvency resolution process, recasting of the liquidation process, and the role of service providers under the Code.”

- To get better enforcement of contracts, the Arbitration & Conciliation Act, 1996 was amended in 2015, 2019 and 2021 to provide for time-bound completion, timely enforcement of awards with restrictions on court interference.
- An expert committee was appointed to evaluate and propose solutions for the problems faced by public-private partnership model for infrastructure development under the stewardship of Dr Vijay Kelkar. This culminated in a comprehensive report issued in 2015, pursuant to which the Government enacted significant changes in law and made necessary budgetary announcements. These include dispute resolution and contract enforcement through amendments to the Specific Relief Act in 2018 with a view to protecting infrastructure projects from stalling while providing for fast-track dispute resolution, using expert testimony. Several States have established Special Courts and Superior Courts (Supreme Court and some High Courts) have noted the amendment. The effectiveness of the institutional mechanism in implementing this change will be seen in the days ahead.
- The last few years have seen a significant change in judicial approach in enforcing vested contractual and statutory rights of private parties. Increasingly, courts of law have recognized the credit risk inherent in infrastructure investments moving away from the age-old approach of favouring public sector undertakings. Courts have recognized that capital (debt and equity) comes at a price; that profit is a return on investment considering the risk; and significance of timely payment of (‘time value of money’) in the wake of rising debts and non-performing assets. This argues well in restoring creditworthiness to investments in these sectors.

6. Building for a Better Tomorrow

Promoting energy transition for accelerating low-carbon growth is a key priority of India’s ongoing renewables revolution. In a world riven by various challenges, not least amongst which are energy security and sustainable economic growth, there is a need to focus on constructive and consensus-based solutions to revive global growth and ensure stronger climate action. Increasing the renewables footprint and greater deployment of decarbonizing solutions in a bid to tackle climate change, are set to have a far-reaching impact on India’s growth story.

“The changed demographics and environment will need the converged development of a host of infrastructure facilities. From the provision of housing, to water and sanitation services, to digital and transportation needs, there is a compelling demand for increased and improved delivery across the entire infrastructure spectrum.” – NIP



Appendix – A | Budget Highlights FY 23- FY24

A.1. Union Budget 2023-2024

- The Union Budget 2023-2044 sets-out a parallel track to the blueprint of the *Amrit Kaal* Vision. The economic agenda for achieving this vision focuses on facilitating ample opportunities for citizens, especially the youth, to fulfil their aspirations; providing strong impetus to growth and job creation; and strengthening macro-economic stability.
- Indian Economy has increased in size from being tenth to fifth largest in the last 9 years. India has significantly improved its position as a well-governed and innovative country with a conducive environment for business as reflected in several global indices and made significant progress in many Sustainable Development Goals.
- The Budget aims to strengthen the economy by focusing on seven priorities, which includes green growth and infrastructure development and investments.
- Key excerpts from the Budget are set out below:

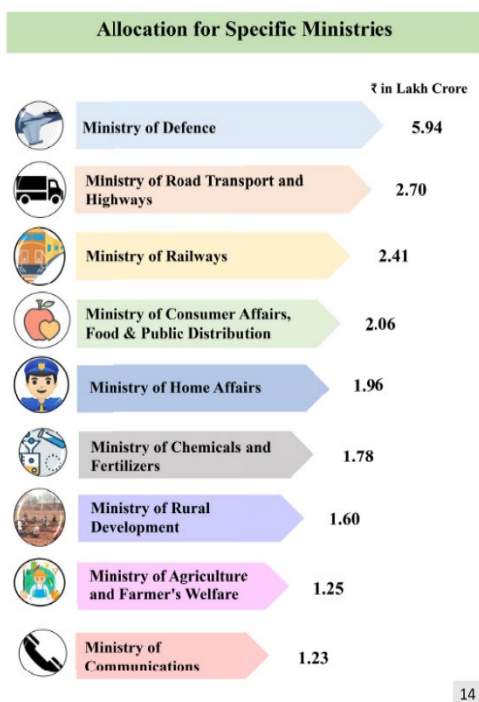


Fig1: Allocation for Specific Ministries
(Source: Ministry of Finance – Budget Division)



Sector	Key Budget Announcements
Green Energy (Power and Renewables)	<ul style="list-style-type: none"> • Reiterated the importance of the launch of National Green Hydrogen Mission, with an outlay of INR 197,000 million, to facilitate transition of the economy to low carbon intensity, reduce dependence on fossil fuel imports, and make the country assume technology and market leadership in this sunrise sector. The target is to reach an annual production of 5 MMT by 2030. • Allocated INR 350,000 million for priority capital investments towards energy transition and net zero objectives, and energy security by Ministry of Petroleum & Natural Gas. • Battery Energy Storage Systems with capacity of 4,000 MWH to be supported with Viability Gap Funding. A detailed framework for pumped storage projects to be formulated. • The Inter-state transmission system for evacuation and grid integration of 13 GW renewable energy from Ladakh to be constructed with investment of INR 207,000 million including central support of INR 83,000 million. • Green Credit Programme to be notified under the Environment (Protection) Act, 1986 to incentivize environmentally sustainable and responsive actions by companies, individuals, and local bodies, and help mobilize additional resources for such activities. • Replacing old polluting vehicle and allocation of INR 51,720 million under the FAME Scheme to scrap old vehicles of the Central Government. States to also be supported in replacing old vehicles and ambulances. • Various Schemes such as: <ul style="list-style-type: none"> – PM- PRANAM to incentivize States and Union Territories to promote alternative fertilizers and balanced use of chemical fertilizers. – Bhartiya Prakritik Kheti Bio-Input Resource Centres to facilitate INR 10 million farmers to adopt natural farming. Setting up of 10,000 Bio-Input Resource Centres to create a national level distributed micro fertilizer and pesticide manufacturing network. – MISHTI for mangrove plantation along the coastline and on salt pan lands, wherever feasible, through convergence between MGNREGS, CAMPA Fund and other sources. – Amrit Dharohar to encourage optimal use of wetlands, and enhance bio-diversity, carbon stock, eco-tourism opportunities and income generation for local communities. – Coastal Shipping to be promoted as the energy efficient and lower cost mode of transport, both for passengers and freight, through PPP mode with viability gap funding.
Bio - Gas	<ul style="list-style-type: none"> • GOBARdhan scheme to establish 500 new 'waste to wealth' plants for promoting circular economy. • In due course, a 5 % compressed biogas plant mandate will be introduced for all organizations marketing natural and biogas and appropriate fiscal support for collection of biomass and distribution of bio manure. • To avoid cascading of taxes on blended compressed natural gas, excise duty on GST-paid compressed bio-gas contained is been exempted from excise duty. • Customs duty exemption has been extended to import of capital goods and machinery required for manufacture of lithium-ion cells for batteries used in electric vehicles.
Infrastructure	<ul style="list-style-type: none"> • The Effective Capital Expenditure of the Centre is budgeted at INR 13.7 trillion, which will be 4.5 % of GDP. To continue the 50-year interest free loan to state governments for one more year to spur investment in infrastructure and to incentivize them for complementary policy actions, with a significantly enhanced outlay of INR 1.3 trillion. • One hundred critical transport infrastructure projects, for last and first mile connectivity for ports, coal, steel, fertilizer, and food grains sectors have been

Sector	Key Budget Announcements
	<p>identified. They will be taken up on priority with investment of INR 750,000 million, including INR 150,000 million from private sources.</p> <ul style="list-style-type: none"> • The newly established Infrastructure Finance Secretariat will assist all stakeholders for more private investment in infrastructure, including railways, roads, urban infrastructure, and power, which are predominantly dependent on public resources. • Fifty additional airports, heliports, water aerodromes and advance landing grounds will be revived for improving regional air connectivity. • States and cities will be encouraged to undertake urban planning reforms and actions to transform our cities into 'sustainable cities of tomorrow'. This means efficient use of land resources, adequate resources for urban infrastructure, transit-oriented development, enhanced availability, affordability of urban land, and opportunities for all. • Through property tax governance reforms and ring-fencing user charges on urban infrastructure, cities will be incentivized to improve their credit worthiness for municipal bonds. • Like the RIDF, an Urban Infrastructure Development Fund (UIDF) will be established which will be managed by the National Housing Bank and will be used by public agencies to create urban infrastructure in Tier 2 and Tier 3 cities. • All cities and towns will be enabled for 100 per cent mechanical desludging of septic tanks and sewers to transition from manhole to machine-hole mode. Enhanced focus will be provided for scientific management of dry and wet waste.
Others	<ul style="list-style-type: none"> • In the drought prone central region of Karnataka, central assistance of INR 53,000 million will be given to Upper Bhadra Project to provide sustainable micro irrigation and filling up of surface tanks for drinking water. • Excise duty exempted on GST-paid compressed biogas contained in blended compressed natural gas. Customs Duty on specified capital goods/machinery for manufacture of lithium-ion cell for use in battery of electrically operated vehicle (EVs) extended to 31.03.2024. • To promote green fuel, central excise duty exemption is being provided to blended Compressed Natural Gas from so much of the amount as is equal to the GST paid on Biogas/Compressed Biogas contained in the blended CNG. • To improve bank governance and enhance investors' protection, certain amendments to the Banking Regulation Act and the Reserve Bank of India Act are proposed. • 3 centres of excellence for AI to be set-up in top educational institutions to realize the vision of "Make AI in India and Make AI work for India". National Data Governance Policy to be brought out to unleash innovation and research by start-ups and academia. R&D grant for lab grown diamonds sector to reduce import dependency by encouraging domestic production. Phase 3 of E-courts to be launched for effective administration of justice.

Partners : Energy & Infrastructure

Lead Contributors



Amit Kapur
Joint Managing Partner
amit@jsalaw.com



Venkatesh Raman Prasad
Partner
venkatesh@jsalaw.com



Vishnu Sudarsan
Partner
vishnu@jsalaw.com

JSA Team



Anupam Varma
Partner
anupam@jsalaw.com



Abhishek Munot
Partner
abhishek.munot@jsalaw.com



Poonam Verma Sengupta
Partner
poonam@jsalaw.com



Ashish Suman
Partner
ashish.suman@jsalaw.com



Akshat Jain
Partner
akshat.jain@jsalaw.com



Kunal Kaul
Partner
kunal.kaul@jsalaw.com



Kartikeya G.S.
Partner
kartikeya.gs@jsalaw.com



Megha Arora
Partner
megha.arora@jsalaw.com



Nikhil Sharma
Partner
nikhil.sharma@jsalaw.com



Shashank Singh
Partner
shashank.singh@jsalaw.com



Shivani Chugh
Partner
shivani.chugh@jsalaw.com



Sugandha Somani Gopal
Partner
sugandha@jsalaw.com



This publication has been prepared for general information purposes only. Nothing in this publication constitutes professional advice or a legal opinion. You should obtain appropriate professional advice before making any business, legal or other decisions. JSA and the authors of this publication disclaim all and any liability to any person who takes any decision based on this publication.