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CRISIL
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Towards sustainable infrastructure

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Foreword

Environmental, Social and Governance (ESG) is the new measurement to assess corporate behaviour and determine a company's future performance. The COVID-19 pandemic and climate change scenario has accelerated the adoption of ESG investing, aiming to include a company's environmental footprint and how it manages relations with its stakeholders.

India needs to have a sustainable infrastructure development approach with a balanced focus on increasing infrastructure investments, raising the economic efficiency of projects, integrating concepts of lifecycle costs and benefits in project planning, and improving the integration of environmental and social considerations in projects. This would require a well-defined framework focusing on project financing and integrating environmental and social considerations across the project lifecycle, emission reduction and community development is critical for achieving this transition.

Effective stakeholder consultations, a detailed understanding of sustainability frameworks and indicators, and improved data collection mechanisms are also enablers of quality disclosures. All these gaps highlight the need for ESG integration from the planning through the execution stages of infrastructure projects.

ASSOCHAM & CRISIL have jointly prepared a comprehensive knowledge paper, providing insights across segments to strengthen India's adoption of the ESG framework. We hope this report, along with the discussions during the India ESG conclave 2022, will help the regulators, market participants, government departments and research scholars to further the sector's development.

Shri Deepak Sood

Secretary General, ASSOCHAM

Towards sustainable infrastructure

What is it and how can it be built?

Investment in infrastructure is known to have a strong multiplier effect, propelling economic growth. By creating jobs, improving accessibility, and raising productivity, it also spawns inclusive and sustainable development.

India has a huge infrastructure gap. More than 50% of India's urban infrastructure required until 2030 — including housing, energy, transport, water, and waste disposal — is yet to be built.[1]

One of the main requirements to meet this, is financing.

Estimates show that India must invest ~$4.5 trillion in infrastructure to improve economic growth and community well-being. But based on the current trend, a shortfall of $526 billion by 2040 is projected[2].

The next challenge is the high cost of borrowing. Infrastructure projects involve implementation and operational risk. Moreover, in public-private partnerships (PPPs), the risk sharing between parties in contracts is not always equitable.

Several infrastructure projects also incur time and cost overruns, as project preparation is inadequate. Project planning tends to take place in silos with limited co-ordination among related ministries.

The current trend shows that India can meet ~$3.9 trillion of infrastructure investment out of $4.5 trillion.

India's cumulative infrastructure investment gap by 2040 would still be ~$526 billion.

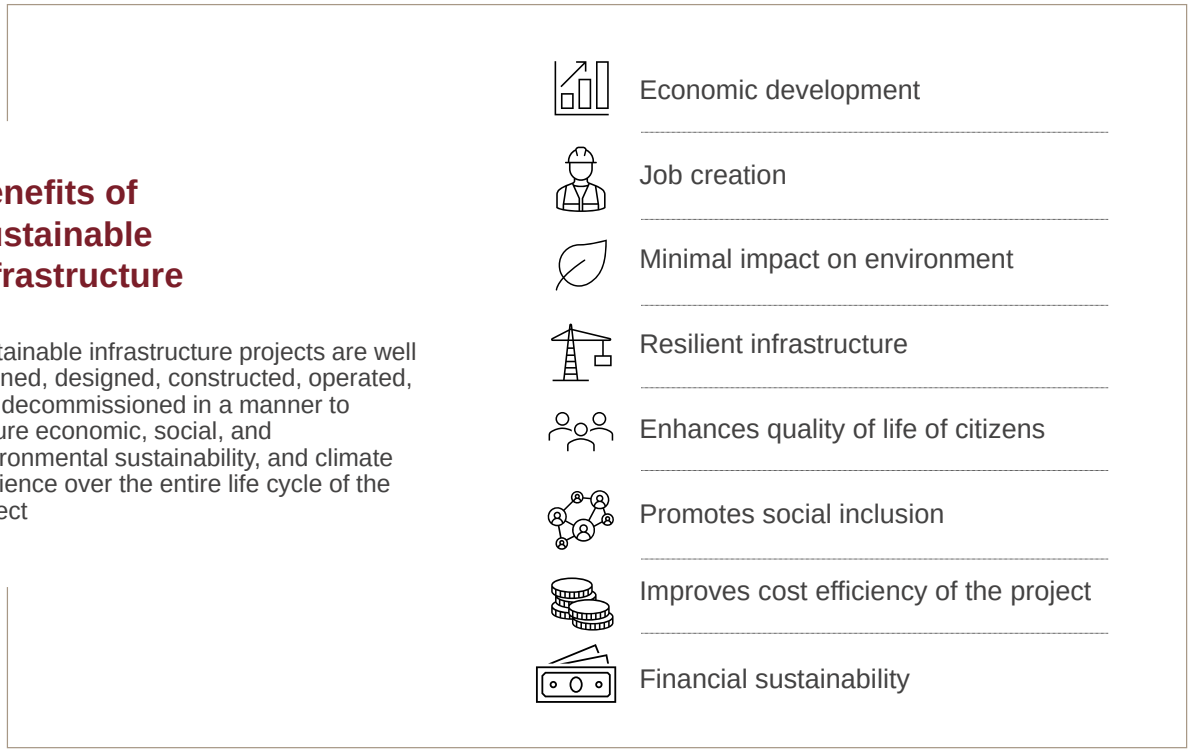
Source: DEA

And then, there is a lack of appreciation of the criticality of quality infrastructure that is inclusive, resilient, environment-friendly, and financially sustainable.

All these gaps highlight the need for environmental, social and governance (ESG) integration right from the planning through execution stages of infrastructure projects.

[1] https://cdn.gihub.org/umbraco/media/4242/gi-hub-iff-green-and-circular-compendium.pdf
[2] https://dea.gov.in/sites/default/files/Sub%20Committee%20Report%20Final.pdf

Figure 1: Benefits of sustainable infrastructure



Source: UNEP

India needs not just infrastructure, but sustainable infrastructure.

A well-defined framework focusing on project financing and integrating environmental and social considerations across the project lifecycle is key for achieving this transition.

This paper outlines the key aspects involved in building such a framework.

Expand the pool of funds available for projects

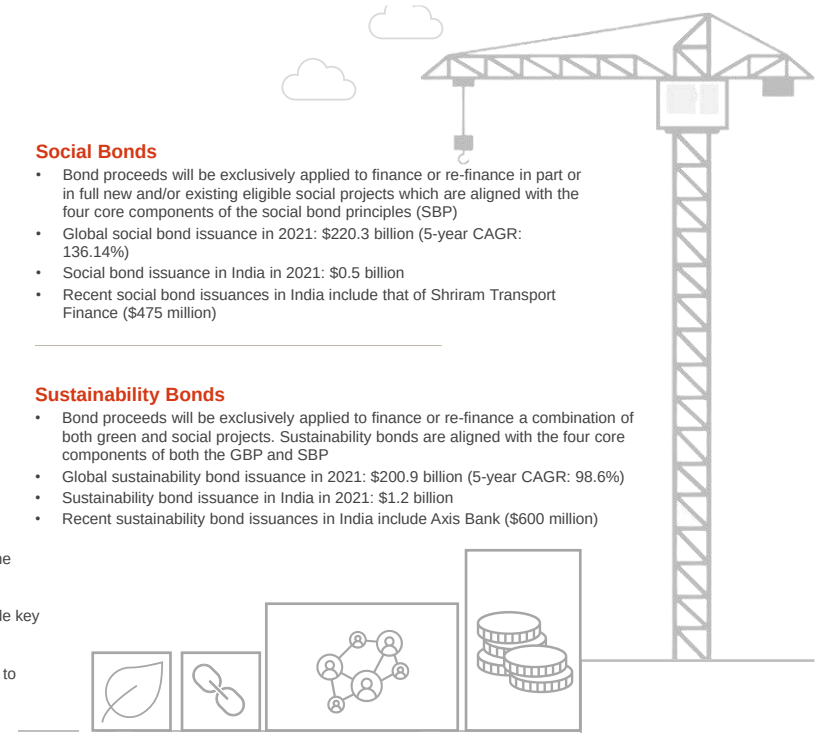
To address financing challenges, rigorous planning and prioritisation, detailed feasibility studies and alignment of stakeholder interests is critical. Alongside, is the need for a conducive and consistent policy and regulatory framework that help make infrastructure projects bankable.

In the current milieu, it must also be borne in mind that integrating sustainability practices (environment protection, inclusiveness and transparency) in the infrastructure build-out could help attract global strategic investors, patient capital from pension and sovereign wealth funds, and multi-lateral agency funding.

This expands the range of financial instruments[3] available, such as green bonds, social bonds, sustainability bonds and sustainability-linked bonds, that can thrive with the right regulatory support.

[3] https://www.climatebonds.net/files/reports/cbi_global_sotm_2021_02h_0.pdf

Figure 2: Overview of sustainable finance instruments available for infrastructure projects



Green Bonds

- Bond proceeds will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible green projects, which are aligned with the four core components of the green bond principles (GBP)
- Global green bond issuance in 2021: $578.4 billion (5-year CAGR: 46.9%)
- Green bond issuance in India in 2021: $8 billion (5-year CAGR: 38%)
- Recent green bond issuances in India include those of: Azure Power Energy ($414 million), Power Finance Corporation ($352 million), ReNew power ($400 million)

Sustainability Linked Bonds

- Bond instrument for which the financial and/or structural characteristics can vary depending on whether the issuer achieves predefined sustainability/ESG objectives
- Global sustainability linked bond issuance in 2021: $118.8 billion
- Recent sustainability linked bond issuances in India include those of: JSW Steel ($500 million), UltraTech Cement ($400 million), Adani Electricity ($300 million)

Sustainability Linked Loans

- Type of loan instruments and/or contingent facilities which incentivize the borrower's achievement of ambitious, predetermined sustainability performance objectives. The borrower's sustainability performance is measured using sustainability performance targets (SPTs), which include key performance indicators, external ratings and/or equivalent metrics, and measure improvements in the borrower's sustainability profile
- Global sustainable lending activity grew from $6 billion in January 2016 to $322 billion in September 2021 (CAGR:121%). 90% of these were sustainability linked loans

Social Bonds

- Bond proceeds will be exclusively applied to finance or re-finance in part or in full new and/or existing eligible social projects which are aligned with the four core components of the social bond principles (SBP)
- Global social bond issuance in 2021: $220.3 billion (5-year CAGR: 136.14%)
- Social bond issuance in India in 2021: $0.5 billion
- Recent social bond issuances in India include that of Shriram Transport Finance ($475 million)

Sustainability Bonds

- Bond proceeds will be exclusively applied to finance or re-finance a combination of both green and social projects. Sustainability bonds are aligned with the four core components of both the GBP and SBP
- Global sustainability bond issuance in 2021: $200.9 billion (5-year CAGR: 98.6%)
- Sustainability bond issuance in India in 2021: $1.2 billion
- Recent sustainability bond issuances in India include Axis Bank ($600 million)

Source: Climate Bonds, ICMA

While project financing can help to break the ground, there are still challenges associated with managing the lifetime costs of projects, including funding maintenance and retrofitting of infrastructure. Projects that do not have fair and equitable generation and distribution of revenue struggle to sustain.

Thus, developers have also started exploring alternative project financing mechanisms to ensure financial sustainability of the projects. Some of these mechanisms include:

- Land value capture to raise tax and rental income from public land
- Infrastructure investment trusts, which enable developers to monetise assets by pooling multiple assets under a single entity (trust structure)
- Road-pricing policies such as congestion charging
- Mapping fee for water and waste services to actual usage and ensuring fees and prices for services factor in the scarcity of the resources being consumed, as well as covering the costs of infrastructure investment and service provision

Additionally, mechanisms such as revolving funds and impact bonds are also helping in closing the financing gap.

Figure 3: Global examples of innovative project financing approaches

Source: ADB , OECD , Global Infrastructure Hub

Disaster and climate risk financing is another major challenge being faced by infrastructure developers. The Intergovernmental Panel on Climate Change (IPCC) warns that damage from sea-level rise in Mumbai alone could be up to $162 billion annually by 2050.

Disaster risk management: Findings from CRISIL's market interactions

- In certain scenarios, financiers request project design to be durable to disaster risks. In some cases, disaster risk financing is also included in contract clauses. However, there is scope for improvement in terms of stringent regulations
- Coalition for Disaster Resilient Infrastructure and Task Force on Climate-related Financial Disclosures (TCFD) reporting can help strengthen climate and diaster risk resilience measures
- The Reserve Bank of India's (RBI) recent discussion paper on climate risk and sustainable finance is aimed at highlighting the importance of and providing guidance on integrate climate risk assessment in the due diligence process

Disaster and climate risk financing in infrastructure projects has become an imperative given the way climate change has been increasingly affecting lives. Catastrophe bonds and disaster risk pooling may help in bridging this gap.

Figure 4: Sample climate and disaster risk funding mechanisms

Catastrophe bonds

Catastrophe bonds are used to hedge insurers' disaster risk liabilities. The bonds are linked to the occurrence of a major disaster and are typically issued for a shorter time frame (e.g., 3 years. Here, an insurer issues the bond in the capital market through a special purpose vehicle with the condition that investors would be paid principal and coupon if no disaster of the defined type and magnitude occurs in a specific location. In the opposite scenario, investors would lose (parts of) their principal and not be paid a coupon, whereas the insurer would use the principal payment to cover its liability payments to the insured

Disaster risk pooling

Allows small entities to join an insurance pool which

(i) reduces the uncertainty around disaster risks due to the distributed risk of a disaster occurring and thus triggering insurance pay-outs;

(ii) correspondingly lowers the premium payments by pool members;

(iii) reduces the operating costs due to joint operation of the insurance pool (including access to much-needed technical capacity);

(iv) allows for profits of the instrument to be retained in the pool, instead of flowing back to the insurance holder, as is typically the case with individual disaster insurance held by a government entity

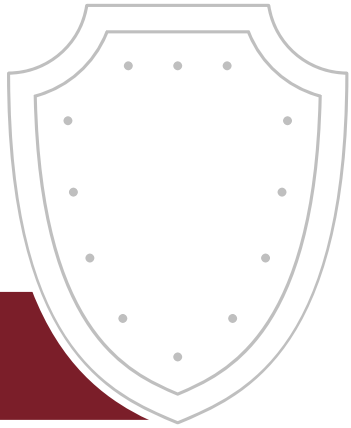
Source: ADB

The Sendai Framework for disaster risk reduction[4] could also help developers in better risk management.

Figure 5: The Sendai Framework for disaster risk reduction

The Sendai Framework for Disaster Risk Reduction 2015-2030 outlines **four priorities** for action to prevent new and reduce existing disaster risks:

1. Understanding disaster risk
2. Strengthening disaster risk governance to manage disaster risk
3. Investing in disaster reduction for resilience
4. Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction



It aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

Source: UNDRR

Investments in infrastructure could also be expanded through impact assessment and ESG due diligence of infrastructure projects. Use of impact metrics such as the Harmonized Indicators for Private Sector

[4] *https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030*

Operations (HIPSO)[5], Anticipated Impact Measurement and Monitoring (AIMM) system[6], QII Principles[7], and GRESB infrastructure asset assessment[8] could help in assessing impact of projects.

Disclosures on key due diligence parameters could also help in gaining trust of investors.

Investors also need to integrate life-cycle costs and benefits in their investment prioritisation models.

Figure 6: Infrastructure investments due diligence parameters

Focus on decarbonization

At COP26, India has committed to achieving Net Zero emissions by 2070. India's updated nationally determined contributions (NDC) include: reducing emissions intensity of its gross domestic product (GDP) by 45% in 2030 over the 2005 level, achieving 50% cumulative non-fossil fuel-based power capacities by 2030, and propagating a healthy and sustainable way of living that includes adoption of a 'Lifestyle for Environment', or LIFE, movement as key to combating climate change.

The infrastructure sector has a key role to play in achieving the NDCs and accomplishing Net Zero.

For this, emission reduction approaches need to be incorporated right at the project planning stage across sectors. This would involve phasing out fossil fuel-based energy generation and transitioning towards low-emission energy sources, improving energy efficiency in buildings through better design and use of insulation, installing carbon capture and storage (CCS) equipment at existing plants by shifting to low-emissions fuel and other inputs, building new low-emissions production capacities for green cement and steel, and decarbonizing commute through use of electric vehicles and promoting active transport. Circular economy also has a key role to play in decarbonization. Use of natural sinks for capturing and removing produced emissions can also help in effective carbon management.

It is recommended to have a project level emission inventory for better project management. Tracking Scope 4 emissions i.e., emissions reduced or avoided by the project, will also be a beneficial metric in project evaluation.

[5] https://indicators.ifipartnership.org/
[6] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/development+impact/aimm
[7] https://www.worldbank.org/en/programs/quality-infrastructure-investment-partnership
[8] https://www.gresb.com/nl-en/infrastructure-asset-assessment/

Integrate environmental considerations

Both positive and negative impacts of infrastructure projects on ecosystems, biodiversity, climate, weather and use of resources should be integrated in the project life cycle. These impacts should be made transparent to all stakeholders.

Projects must adopt an environmental and social mitigation hierarchy framework that: (i) anticipates and avoids risks and impacts, (ii) minimises or reduces them where avoidance is not possible, and (iii) mitigates risks and compensate or offset the residual impacts. The project developers also need to provide access to data and tools to promote stakeholder engagement while managing environmental risks.

Additionally, specific considerations should be made on the impact of projects on emissions, air pollution, energy consumption, water consumption and biodiversity. Data on these parameters should be regularly monitored and reported. Developers need to integrate best practices on these parameters during project planning, construction and operations

Facilitate adoption of emerging technologies to build sustainable infrastructure

Emerging technologies hold immense potential to contribute towards development of sustainable infrastructure. BIM and Digital Twin could contribute towards urban infrastructure development. Dynamic 3D model approaches for design, construction and operation allow for simulation and visualisation of infrastructure systems.

Drones and geospatial solutions provide efficiency and productivity improvement through real-time monitoring capabilities. Drones could also be used for initial topographic surveys of the mining sites. ICT is used to collect traffic related information and energy management. Blockchain and distributed ledger could help in smart contracts for transport and energy.

Use of innovative and emerging technologies could also help in sustainable construction materials manufacturing. For example, blockchain offers the potential to verify the sustainability quotient of steel value chains and provides users reliable data on net carbon impact. Integrating carbon capture into cement manufacturing process helps in carbon sequestration. Cement manufacturers could adopt excess heat recovery technologies to generate electricity from recovered thermal energy, which would otherwise go waste. They could also adopt renewable-based power generation technologies such as solar.

Considerations of privacy and data management should also be factored in, wherever applicable.

Focus on the supply chain and circular economy

Sustainable infrastructure development approaches also include upskilling supply chain partners. Promoting local procurement is a key step towards emission reduction and community development. This would also require bridging skill gap for suppliers and exploring partnerships to promote research and usage of alternative materials.

Life cycle analysis of materials is another key step for sustainable supply chain. It is recommended to start looking at life cycle costs rather than initial costs and consider the end-of-life fate of any product. Best practices include concepts of responsible sourcing of raw materials, environmental product labels for materials, giving preference to suppliers that follow green practices, and adopting lean construction. In certain circumstances, the initial capital expenses for sustainable initiatives may be greater. However, over

the longer term, the payback is large considering the socio-economic advantages of these initiatives and their contribution towards ensuring sustainable operations by limiting uncertainty and managing risks.

Examples of circular economy initiatives in steel and cement industry

	Co-processing of industrial waste
	Substituting fossil fuels with combustible municipal waste or refuse-derived fuels (RDF), biomass, and non-hazardous industrial and commercial waste in combustion process
	Using industrial waste such as fly ash, slag and gypsum for production of blended cements
	Using alumina waste generated by metal and alloy industries to partially replace bauxite in the clinkerisation process during cement manufacture
	Setting up electric arc furnace (EAF) units to convert the collected and processed scrap into steel
	Utilisation of processed slag in the construction of national highways and downstream products such as soil conditioners and paver blocks, among others

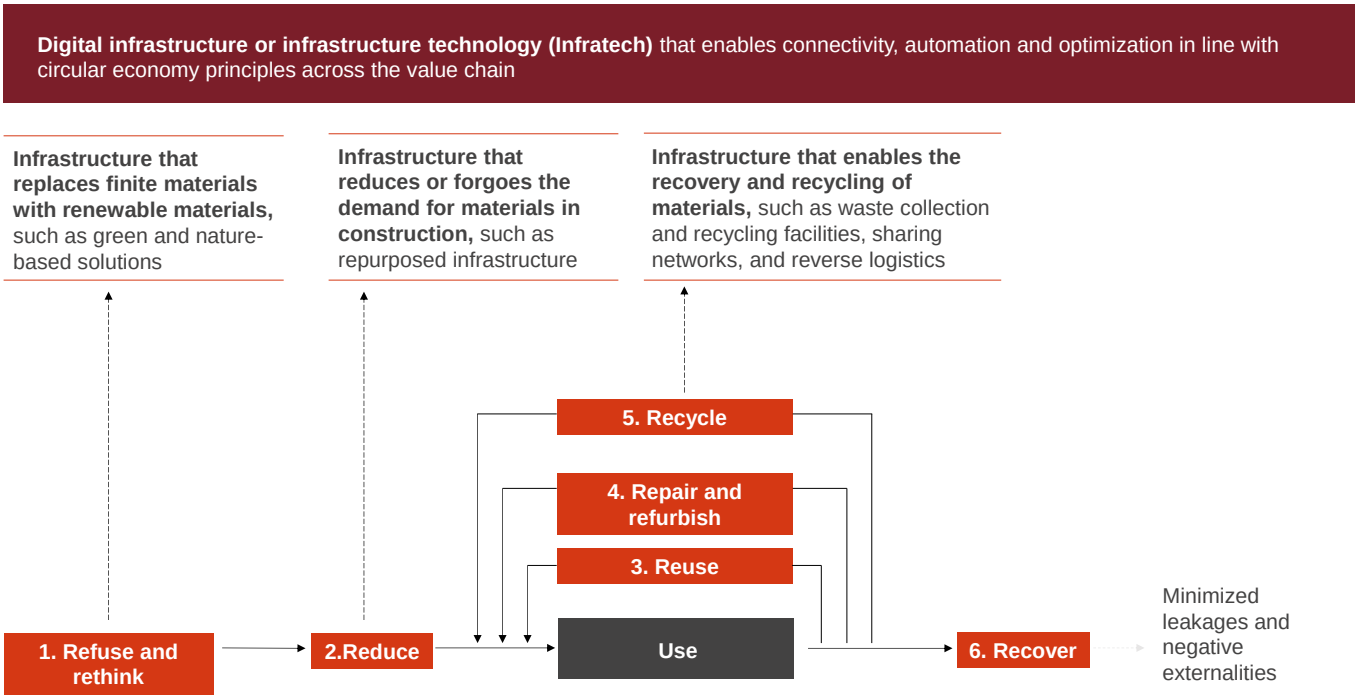
Source: UltraTech Cement, Tata Steel

Integrating circular economy principles is also important in the journey of sustainable infrastructure development. Using circular inputs such a bio-based and recycled products such as plastics for road construction is an effective way of waste management. However, circular infrastructure is much boarder than waste management and incudes approaches such as sharing platforms, products as a service, asset use extension and resource recovery.

A circular infrastructure assets lifecycle starts with circular design, product and material innovation and manufacturing, construction site best practices, asset use and operations, and finally, deconstruction and resource recovery.

Fragmented industry is a key barrier to circular infrastructure. Enhanced cross sector collaboration and improved exposure and awareness to circularity techniques will help project developers in valuing circularity and embracing circular infrastructure design.

Figure 7: Circular loops within construction value



Source: Adapted from GI Hub

Integrate social considerations

To be inclusive, infrastructure projects must evaluate social impacts. The projects should provide non-discriminatory and open access to infrastructure services. They must take into account requirements of differently-abled people while planning. They must also focus on community development and improving lives of under-served populations. Special focus should be given to people affected by land acquisition or displacement because of project development. Project developers should try to upskill and involve the local community in project-related activities.

Additionally, it needs to be ensured that all workers have equal opportunities to access jobs and develop skills for the project. The workers should be provided safe and healthy working conditions.

The project should also use an outcome management approach to measure its impact in improving lives of underserved/marginalised population, wherever applicable.

Initiatives taken to integrate social considerations in projects

	Helping community achieve universal health coverage through financial risk protection, access to quality essential healthcare services and affordable medicines for all
	Responsible procurement policy which considers social value outcomes from the procurement of goods
	Upskilling community through training programs
	Capacity development programs for improving livelihoods of community members impacted due to the project
	Assessing environmental and social risks for suppliers

Source: Adani Power, Larsen & Turbo

Regular stakeholder interactions would help in managing social risks associated with the project.

Role of project disclosures

Transparency about the project and its impact to stakeholders plays a key role in attracting investments in sustainable infrastructure.

To be sure, standardisation of taxonomy and development of sector-specific frameworks which guide developers in project evaluation and impact assessment could help avoid practices such as greenwashing.

Effective stakeholder consultations, detailed understanding of sustainability frameworks and indicators, and improved data collection mechanisms are also enablers of quality disclosures.

This would require interventions to establish such data collection and reporting procedures, and guidance to project developers in integrating environmental and social considerations. These interventions could be in the form of guidance notes, best practices documents, sector-specific guidelines and terms of reference (TORs).

The transition towards sustainable infrastructure would also require extensive focus on capacity building of stakeholders to make them understand and assess the social and environmental impact of infrastructure projects. Effective change management process will be a key lever for a smooth transition.

Sustainable infrastructure development is based on systemic change with balanced focus on increasing infrastructure investments, raising economic efficiency of projects, integrating concepts of lifecycle costs and benefits in project planning, improving integration of environmental and social considerations in projects, and strengthening infrastructure governance.

This would require integrated interventions by investors, regulators, ministries and key stakeholders involved in infrastructure value chain. These interventions will help in improving the quality and efficiency of infrastructure, and implementing innovative approaches to plan, finance, procure and operate infrastructure assets aligned with sustainability criteria.

Conclusion

The key considerations for sustainable infrastructure development can thus be summed up as follows:

Use of data and modelling capabilities, including disaggregated socio-economic data to identify vulnerable groups and address their needs during project planning and development

Setting up emission reduction targets and reporting regular progress on targets

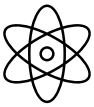
Recognizing the importance of sectoral interdependencies, infrastructure systems should be planned in an integrated way that exploits efficiencies and ensures resilience

Integrate responsiveness to end users in project planning to enhance systems accessibility

Infrastructure site selection should aim at minimizing negative socio-economic and environmental impacts due to the project

Consider geographical characteristics and prioritize lower-carbon solutions

Provide forums for inclusive and participatory discussions and impact assessments to evaluate consequences of project on environment and local communities. Factor in inputs from these throughout the project life cycle



Integrate climate risk and disaster risk considerations in project lifecycle

Plan and coordinate role in inclusive response to emergencies such as natural disasters

Evaluate feasibility of integrating nature-based solutions in project design

Consider flexible and inclusive design of infrastructure assets and facilities to increase resilience of supply chain and allow communities to adapt service delivery more easily

Update procurement processes to prioritize local procurement

Support community development through community engagement in project, education, skill development and inclusive employment

Integrate circular economy principles in project lifecycle

Restore the natural environment after asset decommissioning, wherever possible

Ensuring recycling or safe disposal of hazardous or toxic by-products from decommissioned infrastructure

Provide access to regular project related data including environmental and social impacts due to the project to stakeholders. This helps in improving project transparency and accountability.

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The Knowledge Architect of Corporate India

The Associated Chambers of Commerce & Industry of India (ASSOCHAM) is the country's oldest apex chamber. It brings in actionable insights to strengthen the Indian ecosystem, leveraging its network of more than 4,50,000 members, of which MSMEs represent a large segment. With a strong presence in states, and key cities globally, ASSOCHAM also has more than 400 associations, federations, and regional chambers in its fold. Aligned with the vision of creating a New India, ASSOCHAM works as a conduit between the industry and the Government. The Chamber is an agile and forward-looking institution, leading various initiatives to enhance the global competitiveness of the Indian industry, while strengthening the domestic ecosystem. With more than 100 national and regional sector councils, ASSOCHAM is an impactful representative of the Indian industry. These Councils are led by well-known industry leaders, academicians, economists and independent professionals. The Chamber focuses on aligning critical needs and interests of the industry with the growth aspirations of the nation. ASSOCHAM is driving four strategic priorities – Sustainability, Empowerment, Entrepreneurship and Digitization. The Chamber believes that affirmative action in these areas would help drive an inclusive and sustainable socio-economic growth for the country. ASSOCHAM is working hand in hand with the government, regulators, and national and international think tanks to contribute to the policy making process and share vital feedback on implementation of decisions of far-reaching consequences. In line with its focus on being future-ready, the Chamber is building a strong network of knowledge architects. Thus, ASSOCHAM is all set to redefine the dynamics of growth and development in the technology-driven 'Knowledge-Based Economy. The Chamber aims to empower stakeholders in the Indian economy by inculcating knowledge that will be the catalyst of growth in the dynamic global environment. The Chamber also supports civil society through citizenship programmes, to drive inclusive development. ASSOCHAM's member network leads initiatives in various segments such as empowerment, healthcare, education and skilling, hygiene, affirmative action, road safety, livelihood, life skills, sustainability, to name a few.

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