

# VALUE CHAIN APPROACH TO DECARBONIZE THE BUILDING & CONSTRUCTION SECTOR IN INDIA

## BUSINESS CHARTER



## FOREWORD

In the year 2030 we aim to achieve the UN Sustainable Development Goals and that year is also a key milestone for the implementation of the Paris Agreement to avoid the worst impacts of the climate crisis. If, we are to navigate this decade of implementation then decisive, action-oriented business leadership is the need of the hour.

The Intergovernmental panel on climate change's special report on global warming of 1.5 degrees Celsius underscores that all sectors must decarbonize by 2050. This will require the entire building and construction sector value chain to decarbonize, and it subsumes emissions associated with – production, transportation, and disposal of building materials and the construction of buildings.

The building and construction industry possesses a diverse and fragmented value chain made up by different actors and their societal and environmental impacts are significant. A consortium steered by WRI India along with the Alliance for an energy efficient economy (AEEE), EcoCollab and Mahindra Lifespace Developers organized stakeholder consultations and identified several key actions for the value chain across the sector. This business charter outlines actions for Architects, Designers, Developer and Contractors, Property owners, Facility managers, Material manufacturers and industry bodies that will imperative if the sector is to be decarbonized.

It is time that we catalyze a new leadership model in the building and construction sector that places people and planet at the center of business purpose. Let's embrace leadership that is inclusive, transparent, and collaborative. Let's commit to decarbonizing the buildings and construction sector while simultaneously creating value for all stakeholders.

This business charter is a call to action to put the sector on a net-zero pathway. We believe that business leaders in India can commit to actions under this charter and demonstrate that climate action and profit go hand in hand. Collective engagement offers the opportunity to leapfrog rather than getting locked-in to high carbon building stock. The business charter will help catalyze change by integrating vision, people and performance.



**Anand Mahindra**  
*Chairman, Mahindra Group*

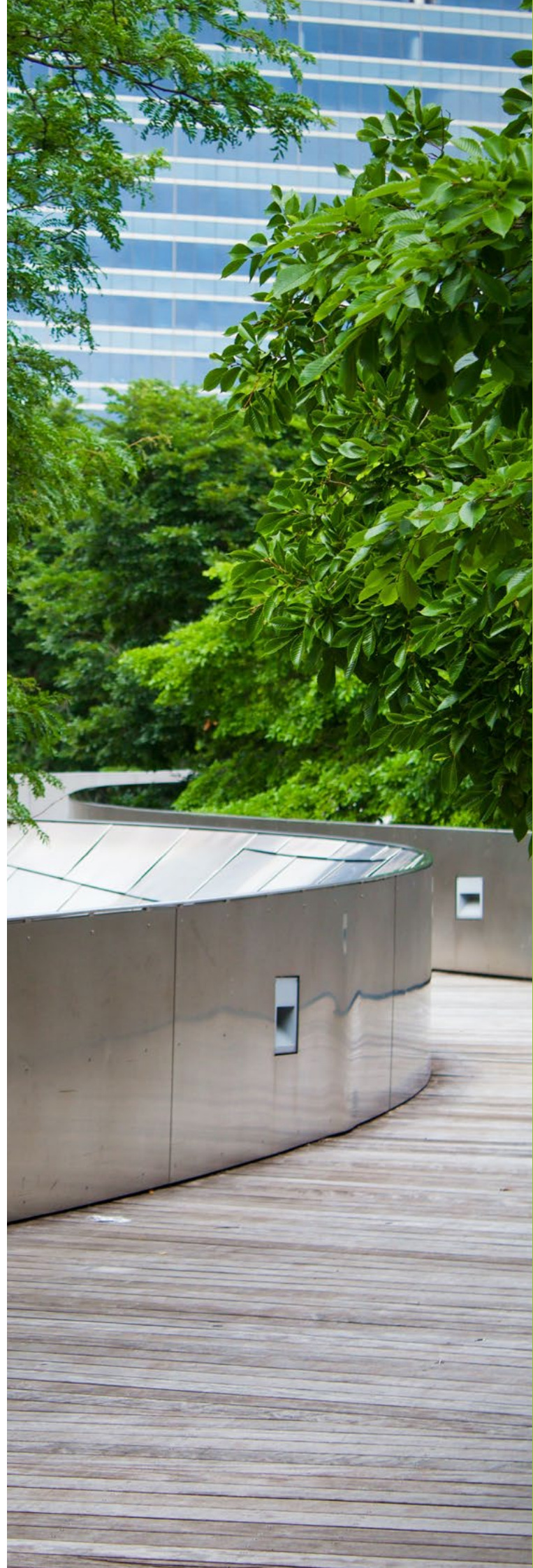
# WHY THE URGENCY?

## Where are we and where are we going with the business-as-usual scenario?

The Intergovernmental Panel on Climate Change (IPCC)'s first part of its sixth assessment report (AR6)<sup>1</sup> concludes that the earth will be 1.4 – 4.4°C hotter than the pre-industrial level by the end of century depending on whether the greenhouse gas (GHG) emissions are rapidly cut to net-zero or continue to rise.

India is poised to become the third largest construction market in the world. The real estate sector in India is expected to reach a market size of US\$1 trillion by 2030 from US\$120 billion in 2017 and contribute 13% to the country's GDP by 2025<sup>2</sup>. Government initiatives such as Pradhan Mantri Awas Yojna-Urban (PMAY-U)<sup>3</sup> will add about 360 million sq. m. to the building footprint<sup>4</sup>. Houses built under PMAY will have a lifespan of 40 – 60 years. Hence, decisions taken now will have an impact on the thermal comfort, energy use, and GHG emissions over the lifetime of the buildings. This provides India with a unique opportunity to adopt a low-carbon pathway that could enable the transition towards net-zero building and construction sector.

Buildings and construction sector in India contributes ~25% of India's GHG emissions<sup>5</sup> which is likely to increase in the future due to increased energy demand. Concentrated construction activities in urban areas, traditional built structures and the steady growth of appliance use (mostly for cooling) will contribute to the rapid rise in energy demand from the building and construction sector in India<sup>6</sup>.



## Value proposition of the business charter

In a carbon constrained world, conventional (virgin) materials and infrastructure created using these materials will be cost intensive. This is evident from the renewed focus of the industry on demand reduction of virgin materials and circularity<sup>7</sup> which is yet to scale up. The buildings will be energy-intensive during the operational stage and would require regular upgrade and maintenance work. This arrangement is not sustainable in the long run.

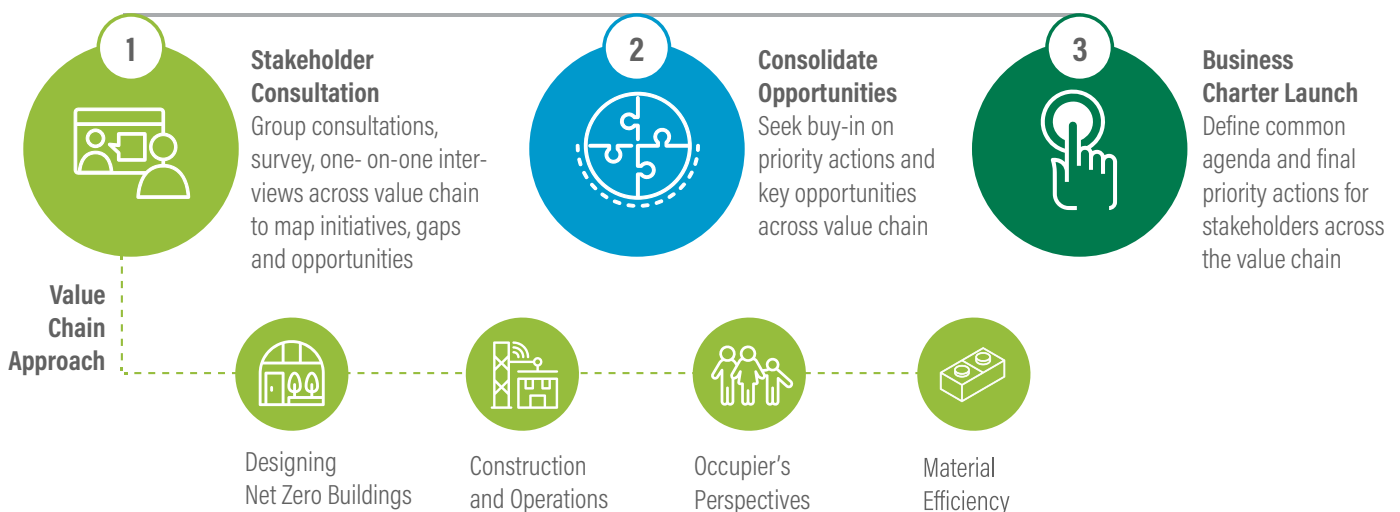
The financial impact of climate risks to the Indian businesses is estimated to be a whopping ₹7,138 billion<sup>8</sup> in 2020. If the current energy intensive practices continue, energy-related CO<sub>2</sub> emissions from the building sector will increase by ~82% in 2050 as compared to 2021 levels<sup>9</sup>. This will further increase the climate risks for Indian businesses.

Therefore, decarbonizing the sector is of paramount importance; however, this would require coming together of multiple stakeholders across the value chain. Through extensive stakeholders' consultations, surveys, and one-to-one discussions with the businesses, this business charter provides clear strategies and action points in near, medium, and long-term for all stakeholders in the value chain.

Businesses are uniquely positioned to influence the value chain to adopt a low-carbon pathway. By adopting the low-carbon action points and strategies, businesses would also provide a clear signal to the market and the policy makers to develop conducive policies that would enable smooth transition to the net-zero building and construction sector.

## APPROACH

The building and construction sector has a very diverse and fragmented value chain. In order to effectively de-risk from climate risks, participation and co-ordinated action from all value chain players is required. WRI India, in partnership with the core partners, Alliance for an Energy Efficient Economy (AEEE), EcoCollab, and Mahindra Lifespace Developers Limited (MLDL), engaged with stakeholders to carve out an impactful pathway to decarbonize the sector across the value chain to inform the business charter for the sector. We engaged with architects, structural engineers, developers, corporates, conventional and alternative raw material manufacturers, construction and demolition waste processors, etc. to inform the business charter. The overall approach involved three broad steps:

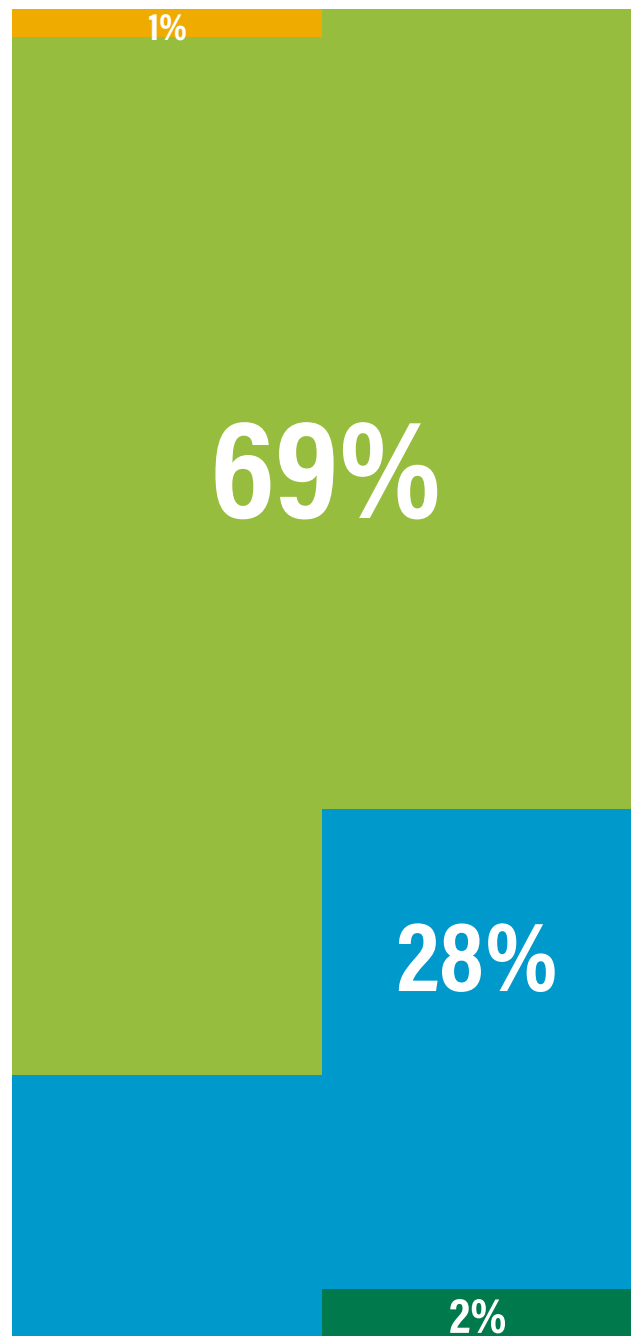


# KEY STAKEHOLDERS ACROSS THE VALUE CHAIN

The building and construction ecosystem is highly fragmented, with many steps along the product life cycle. In this highly complex ecosystem, different players are involved and work in an integrated manner throughout the construction phase. Depending on the asset type and energy consumption involved in processing, loading, transporting and machinery operations each stakeholder has an impact on emissions at multiple stages of the building life cycle. Across the value chain, the construction ecosystem accounts for approximately 25 percent of global GHG emissions<sup>10</sup>.

We have explored the role several key players can contribute to this transformation; for example, developers can influence design and planning, while contractors can have an impact on construction of new buildings and upgrades to existing stock. The image on the right shows the significant phases of construction which have the highest emissions impact. This helps us understand and identify the key relevant stakeholders which are crucial to be involved while moving ahead in this transition. Material emissions are inversely proportional to the lifecycle of the material and are subjective to differ. Thus, correlation between lifecycle of building and material sustainability is important.

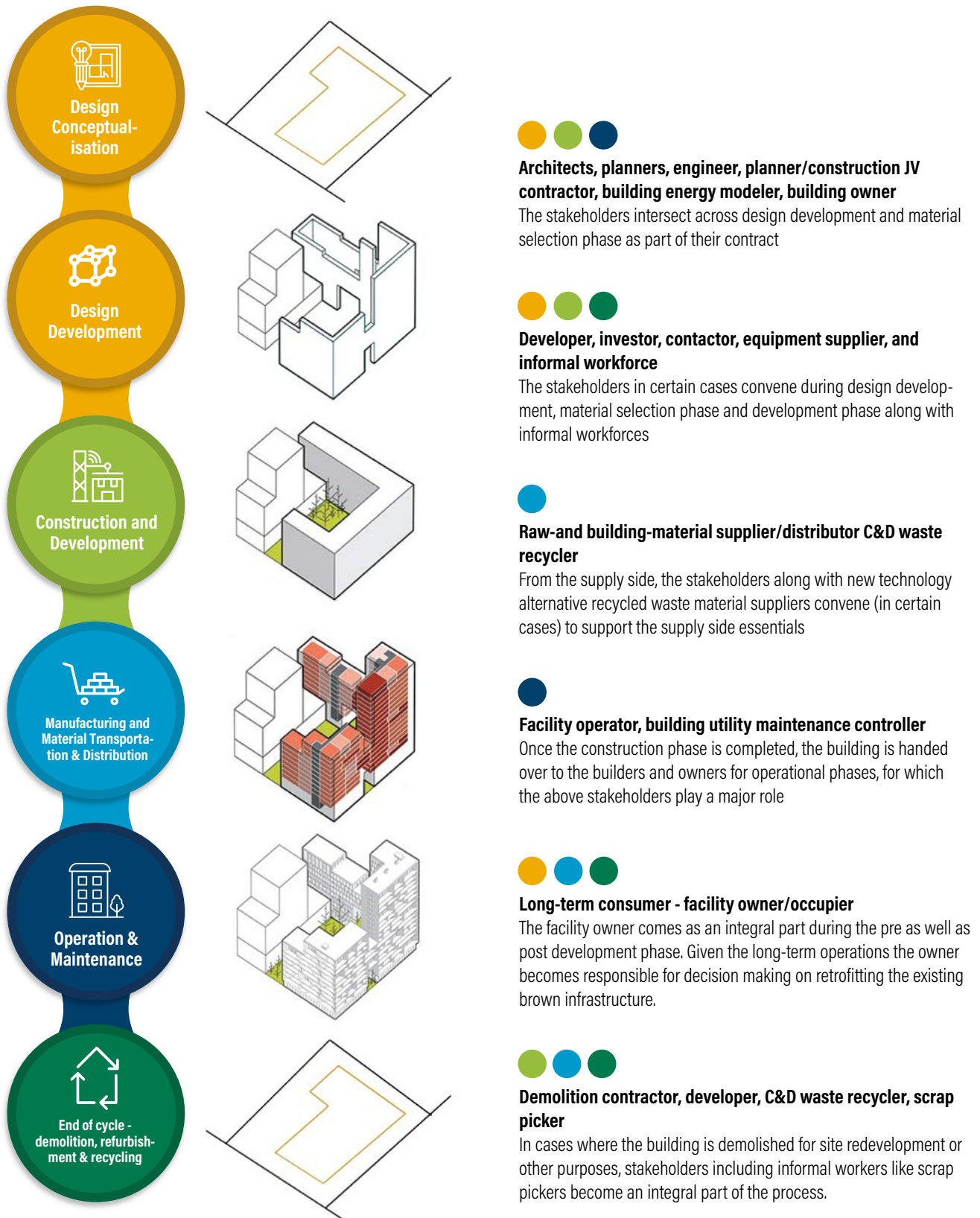
## Share of GHG emissions across the construction value chain



- Design Stage**  
Energy usage in designing and planning
- Operations and Utility Management**  
Energy consumption for BEMS, renewal and maintenance works, usage
- Processing Raw Materials**  
Energy consumption for production manufacturing
- Construction Activities**  
Energy consumption for construction activity, transportation, on-site equipments

# Mapping key stakeholders across the value chain

## Building life cycle

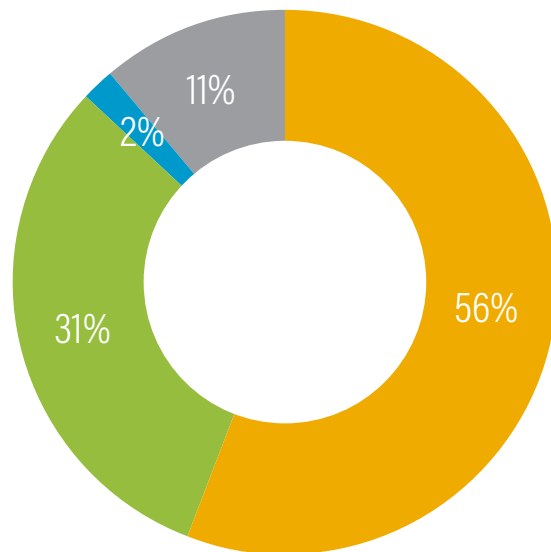


Note: Color codes represent intersection among stakeholder groups across different phases of the building lifecycle.

## Insights from consultations

The mapping tree presented above gives a macro-picture of the stakeholders to be prioritized while aiming for decarbonization of the buildings and construction sector value chain. But to understand the case further from the stakeholder point of view, our consultations and one-on-one interactions built a strong reasoning to understand the micro-picture. This understanding and learning forms the backbone of the business charter and is an “evidence-based approach” to put forward the challenges and barriers, gaps, and top three priority actions for the key stakeholders across the value chain. Below are some responses and insights from the surveys and poll responses from stakeholders during our consultations:

## Major challenges faced by stakeholders across the value chain for the transition



- Lack of capacity building
- Lack of knowledge and awareness
- Lack of institutional frameworks in place
- Others



### Key gaps that need to be bridged for the transition to net-zero:

- Consumer awareness
- Knowledge and capacities among stakeholders across the value chain
- Data on embodied carbon of materials
- Pilot demonstrations and case studies



### Key enabling measures:

- Amending regulations to mandate energy efficiency at design stage
- Improving market conditions for implementation (technical expertise, affordability and access)
- Increase the uptake of life cycle analysis
- Mandatory environmental product declarations (EPDs) from manufacturers



### Just Transition:

Private sector companies (includes builders, construction companies, material suppliers, etc.) and centre and state governments as important actors in the 'just' transition of building and construction sector to low-carbon pathway



95% of the respondents agreed that net-zero buildings should be aligned with 1.5° pathway



80% of the respondents agreed on the need for decarbonization of the sector

From these learnings, we have identified the barriers to accelerated decarbonization, which have been listed next. Finally, high-level recommendations and areas of intervention are mapped for the key stakeholders to holistically build the case for and implement change as part of its broader decarbonization strategy within realistic timeframes.





# PRIORITY BARRIERS IDENTIFIED



**Architects, Planners, Engineer, Planner/ JV Contractor, Energy Modeler**

**Barriers faced by architects and designers during the design phase:**

- Limited knowledge and implementation of climate responsive design, LCA approach
- Absence of a repository of local, upcycled, or low carbon materials
- Lack of ECBC guideline deployment owing to time and knowledge constraints, conflicting interests



**Developer, Investor, Contactor, Equipment Supplier, Mason and Others**

**Barriers faced by architects and technical experts during the construction phase:**

- Challenge in deploying energy efficiency and renewable energy during construction
- Lack of awareness among contractors and site engineers
- Hesitance from consumers and contractors to use alternatives and myth of associated high cost
- Availability of low carbon products, their technical know and servicing



**Raw- and Building-Material Supplier/ Distributor C&D Waste Recycler**

**Facility operator, building utility maintenance control, raw and building-material supplier/distributor C&D waste recycler:**

- Little know-how and awareness of methodologies, technologies, standards, and supply side actors
- No incentives or motivation for consumers
- Limited skills and implementation of design strategies for long lasting and light weight design
- Renewable energy: Barrier in adopting post occupancy, net metering laws
- Resource efficient use of C&D waste and uptake of recycled input
- Most rating tools only consider operational carbon




**Long-term Owner/Occupier**

**Barriers faced by owners and occupants in the operational phase:**

- Lack of benchmarking
- Awareness and knowledge gaps
- Technological barriers for BEMS
- Economic feasibility barrier to retrofitting and renovating

## Springboard Analysis for Prioritizing Barriers

The springboard analysis below helps identify the priority barriers across the value chain and the common threads to bridge the identified barriers. The matrix is a confluence of how the barriers can be addressed within specific elements of institutional mechanism, financial backstopping, and behavioral change.

Elements of challenge	Key stakeholders across the value chain				
	 Architects, planners, engineer, planner/ JV contractor, energy modeler	 Developer, investor, contractor, equipment supplier, mason and others	 Raw- and building-material supplier/ distributor C&D waste recycler	 Long-term owner/occupier	 Demolition contractors, developers, C&D waste recyclers, scrap picker
Institutional frameworks, standards					
Backstopping schemes / fiscal instruments					
Awareness & capacity building					
Cost-benefits					
Technological developments and market availability					
Commitment and action					

# COMMITMENT

## FROM SIGNATORIES ON PRIORITY ACTIONS ALIGNED WITH NET-ZERO

1.

Design  
Net-zero  
Buildings

Adopt climate-responsive design, life-cycle assessment, and mainstream low-carbon materials to minimize emissions during the construction and operational phase of the buildings.



**Primary stakeholders:**

architects, urban planners/ designers, civil engineers, energy modellers, property owners

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**Secondary stakeholders:**

developers and contractors, material manufacturers

2.

Adopt  
science-based  
net-zero targets

Commit to science-based targets and develop 25% of the new buildings as net-zero buildings by 2030 through climate-responsive and low-carbon design practices.



**Primary stakeholders:**

developers and contractors

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**Secondary stakeholders:**

architects, urban planners/ designers, civil engineers, energy modellers, material manufacturers

3.

Improved  
operational  
efficiency for  
net-zero buildings

Commit to efficiency improvement targets and make public ESG disclosures on building energy and resource consumption to report and track performance against targets.



**Primary stakeholders:**

property owners, facility managers, occupiers

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**Secondary stakeholders:**

architects, urban planners/ designers, civil engineers, energy modellers, material manufacturers, rating agencies

## 4.

### Mainstream low-carbon materials for net-zero buildings

Commit to environmental product declaration (EPD) and declaring embodied emissions for all the products and mainstream 4-R (Reduce, Reuse, Remanufacture and Recycle) by 2025.



**Primary stakeholders:**

technology developers, innovators, material manufacturers

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**Secondary stakeholders:**

architects, urban planners/ designers, civil engineers, energy modellers, developers and contractors, rating agencies

## 5.

### Develop and mainstream climate-aligned building codes and standards

- 1) Work with government stakeholders or bodies to update codes and adopt and implement material standards aligned with country's long-term climate goals and build capacities to implement low-carbon solutions.
- 2) Develop clear guidelines on life cycle assessment (LCA), performance indicators and quantitative key metrics for building efficiency, in line with India's long-term climate goals.



**Primary stakeholders:**

developers and contractors

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**Secondary stakeholders:**

architects, urban planners/ designers, civil engineers, energy modellers, material manufacturers

## 6.

### Enabling monitoring and tracking performance of a net-zero building

By 2025, aim to install building performance monitoring systems for all the upcoming buildings.



**Primary stakeholders:**

property owners, property occupiers, facility managers

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**Secondary stakeholders:**

all stakeholders across the value chain

# SIGNATORIES TO THE BUSINESS CHARTER



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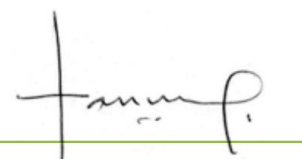
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Gohemp Agroventures

Creating ecological lifestyles....

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Eco<sup>2</sup> Friendly Solutions

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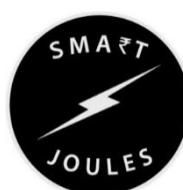


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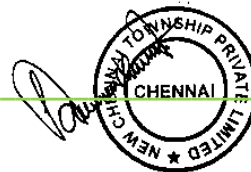
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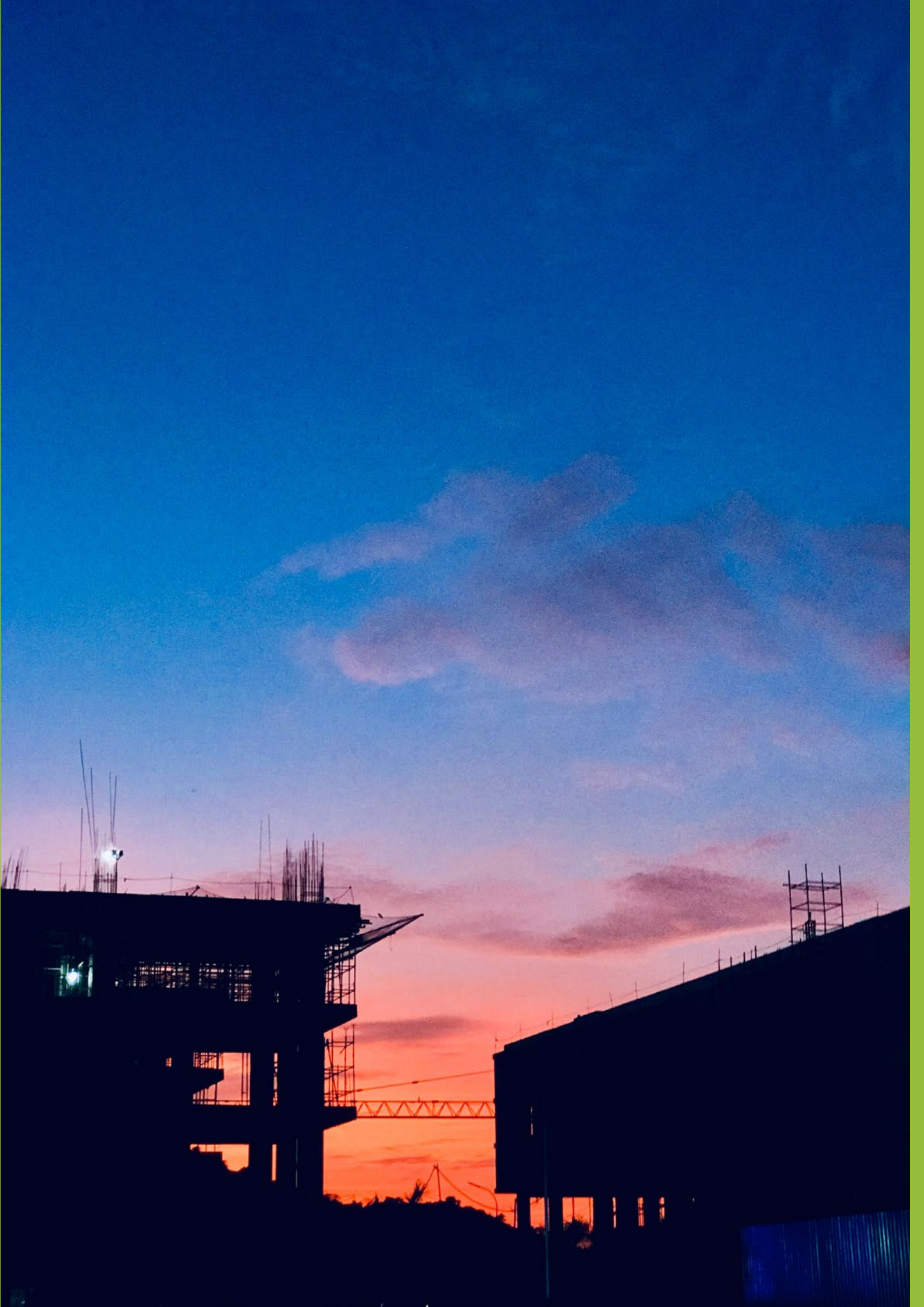
**STRAWCTURE ECO**

EMPOWERING SUSTAINABLE CONSTRUCTION

SHRITI PANDEY  
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## REFERENCES

1. AR6 Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/>
2. IBEF Indian Real Estate Industry Report, Nov 2020 <https://www.ibef.org/industry/real-estate-india.aspx>
3. Pradhan Mantri Awas Yojna: Housing for All (Urban) 2015 Mission Document [https://pmaymis.gov.in/PDF/HFA\\_Guidelines/hfa\\_Guidelines.pdf](https://pmaymis.gov.in/PDF/HFA_Guidelines/hfa_Guidelines.pdf)
4. Decoding India's residential building stock characteristics to enable effective energy efficiency policies and programs [https://www.eceee.org/library/conference\\_proceedings/eceee\\_Summer\\_Studies/2019/7-make-buildings-policies-great-again/decoding-indias-residential-building-stock-characteristics-to-enable-effective-energy-efficiency-policies-and-programs/](https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2019/7-make-buildings-policies-great-again/decoding-indias-residential-building-stock-characteristics-to-enable-effective-energy-efficiency-policies-and-programs/)
5. India's Third Biennial Update Report to the UNFCCC, 20 Feb 2021 <https://unfccc.int/documents/268470>
6. IEA, India Energy Outlook 2021, Feb 2021 <https://www.iea.org/reports/india-energy-outlook-2021>
7. Tata Steel, Conserving natural resources for tomorrow <https://www.tatasteel.com/investors/integrated-report-2018-19/natural-capital.html>
8. CDP India Annual Report, 2020 Building Back Greener – India Inc. Demonstrates Climate Resilience [https://6fefcbb86e61afb2fc4-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/005/595/original/CDP\\_India\\_Report\\_2020.pdf?1614942595](https://6fefcbb86e61afb2fc4-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/005/595/original/CDP_India_Report_2020.pdf?1614942595)
9. Energy Policy Simulator, India <https://india.energypolicy.solutions/>
10. Call for action: Seizing the decarbonization opportunity in construction

## ACKNOWLEDGEMENT

WRI India would like to thank the partners – Alliance for an Energy Efficient Economy, Mahindra Lifespace Developers Limited, and EcoCollab for their support during the various stages of the project. WRI India, on behalf of the partners, would also like to thank more than 150 stakeholders and experts who joined the discussion during the four stakeholders' consultations.

The project and the business charter are prepared with support from Bloomberg Philanthropies.