



Bureau of Energy Efficiency



सत्यमेव जयते
Government of India
Ministry of Power



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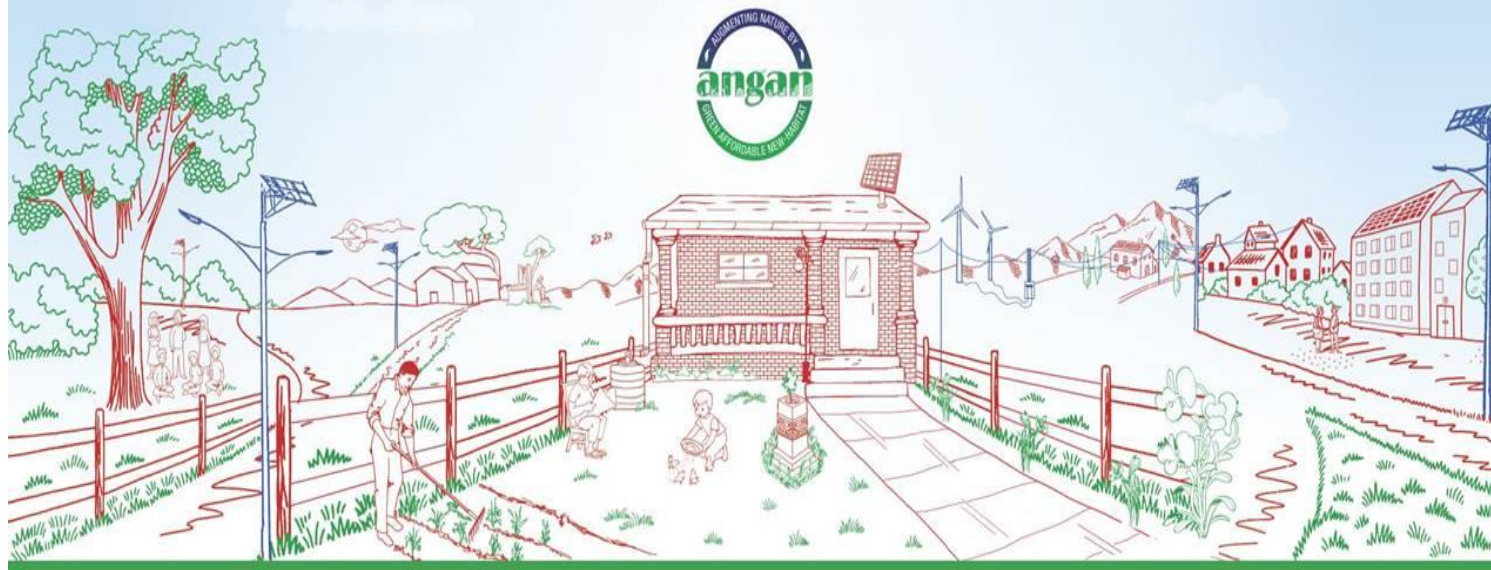
ANGAN

Augmenting Nature by Green Affordable New-habitat

A Courtyard for Revolutionary Change in Building Energy Efficiency

An International Conference on Building Energy Efficiency

9th-11th September, 2019 | Hotel The LaLiT, New Delhi





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THIS PRESENTATION WAS SHARED BY

Sivaram
Krishnamoorthy

International Finance Corporation (IFC)

FOR THE SESSION:

*“Market Development & Financing Mechanisms
for Energy Efficiency”*

DURING ANGAN 2019



Knowledge Partner



Event Partner



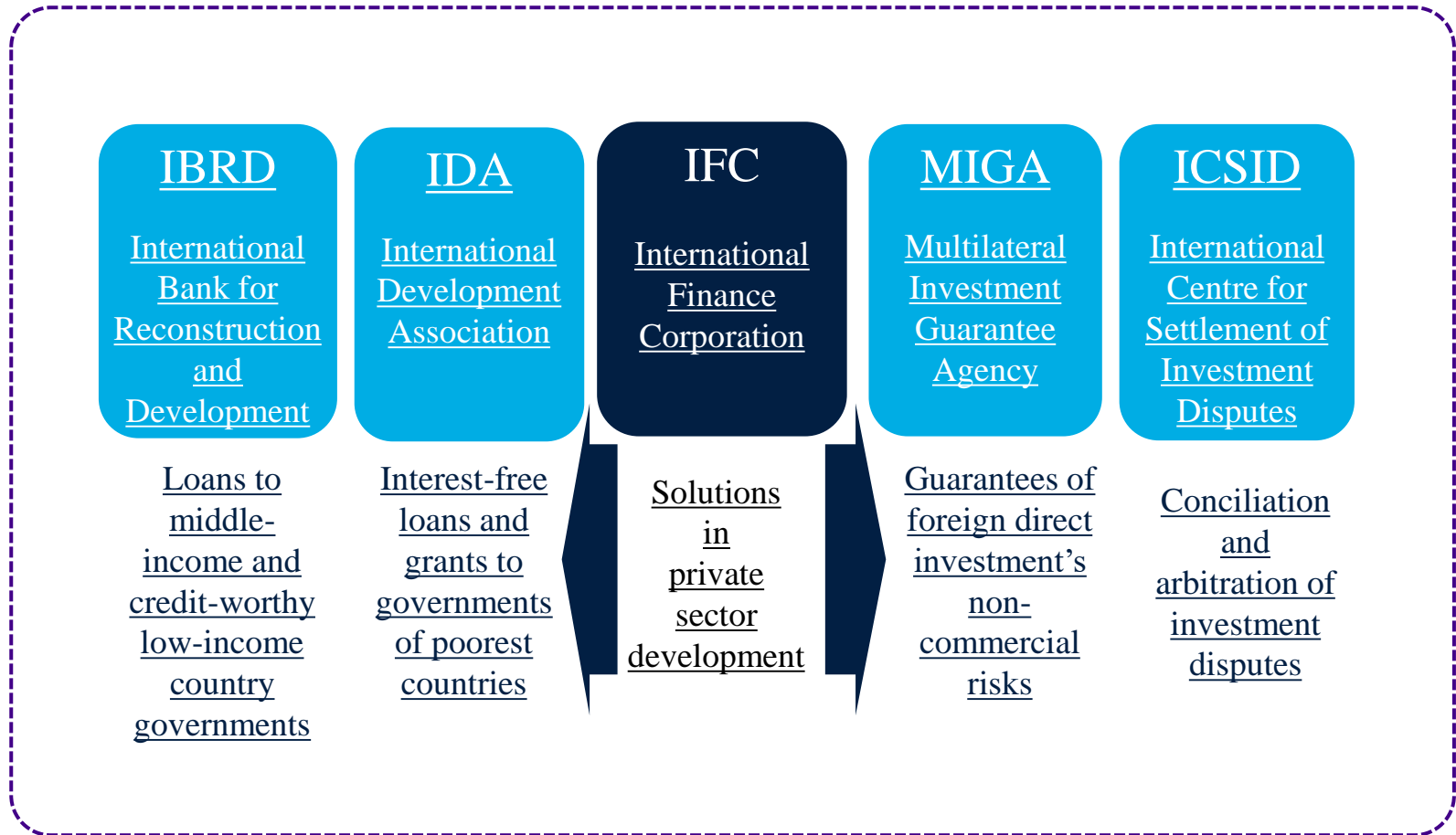


Market Development & Financing Mechanisms for Energy Efficiency

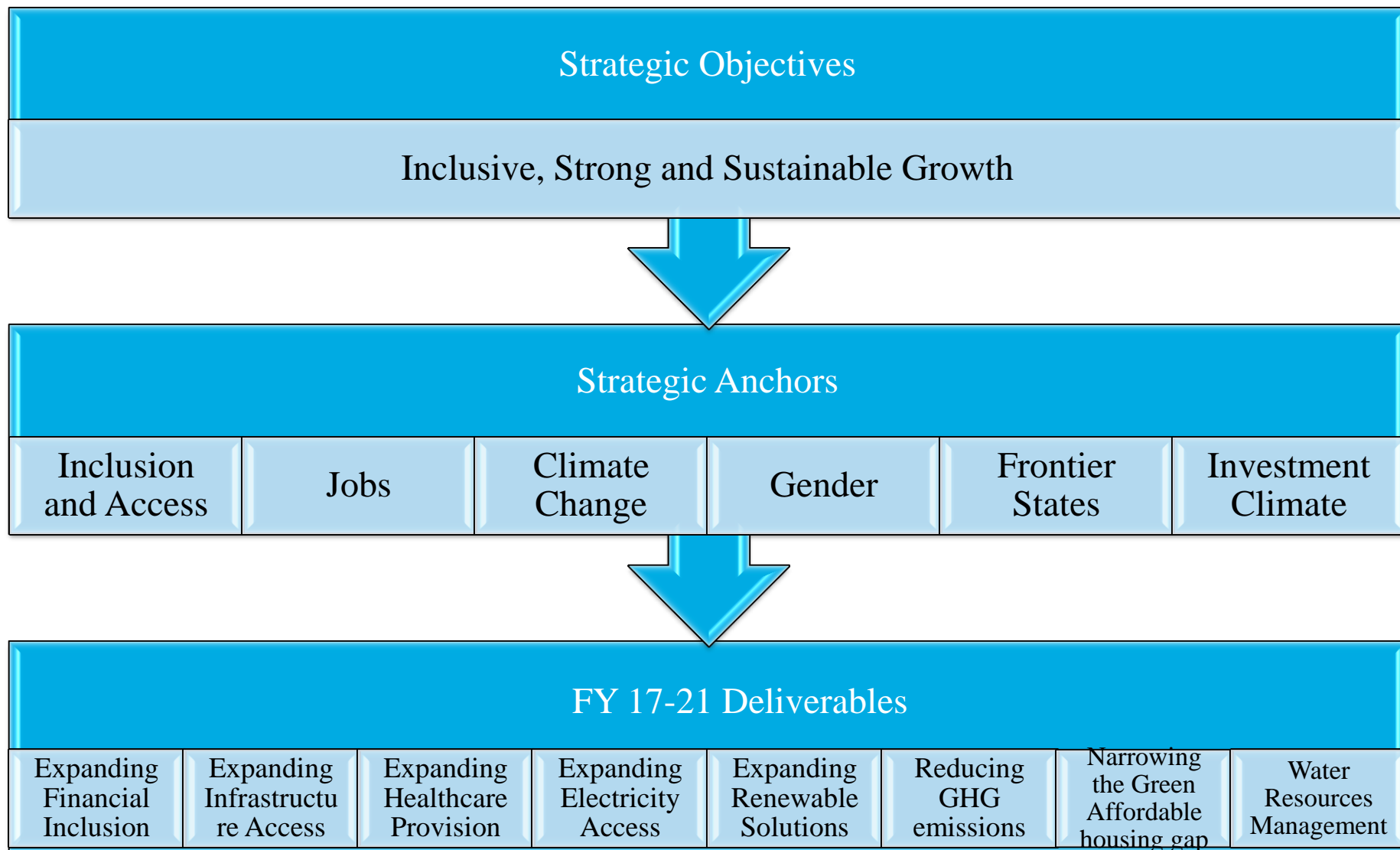
**Augmenting Nature by Green Affordable New-
Habitat (ANGAN), New Delhi, 10 Sep 2019**

Sivaram Krishamoorthy, Operations Officer

IFC IS THE LARGEST DEVELOPMENT BANK FOCUSED SOLELY ON THE PRIVATE SECTOR



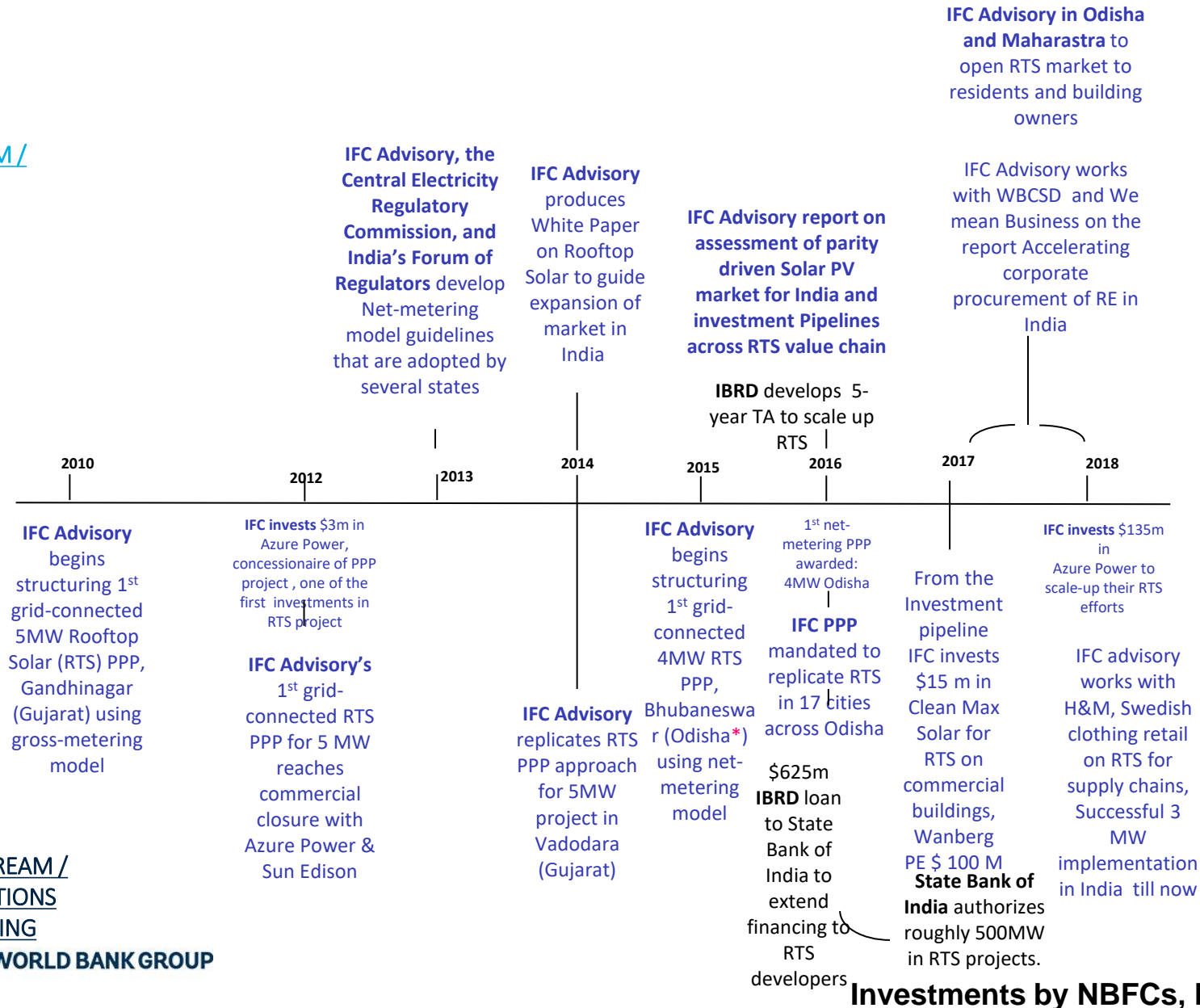
India Strategy Framework



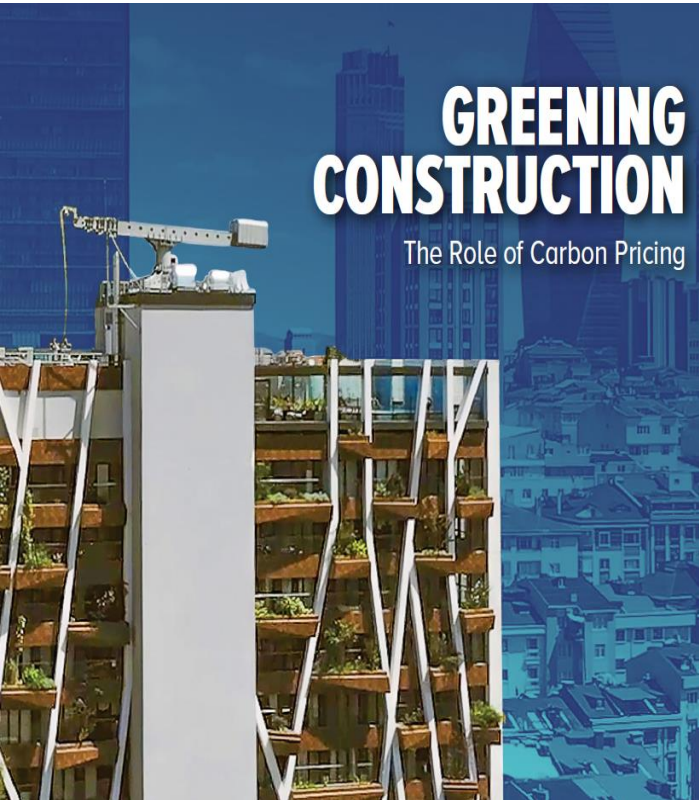
India: Rooftop Solar market development

UPSTREAM /
SECTOR

DOWNSTREAM /
TRANSACTIONS
& FINANCING



Market development approaches: The Role of Carbon Pricing



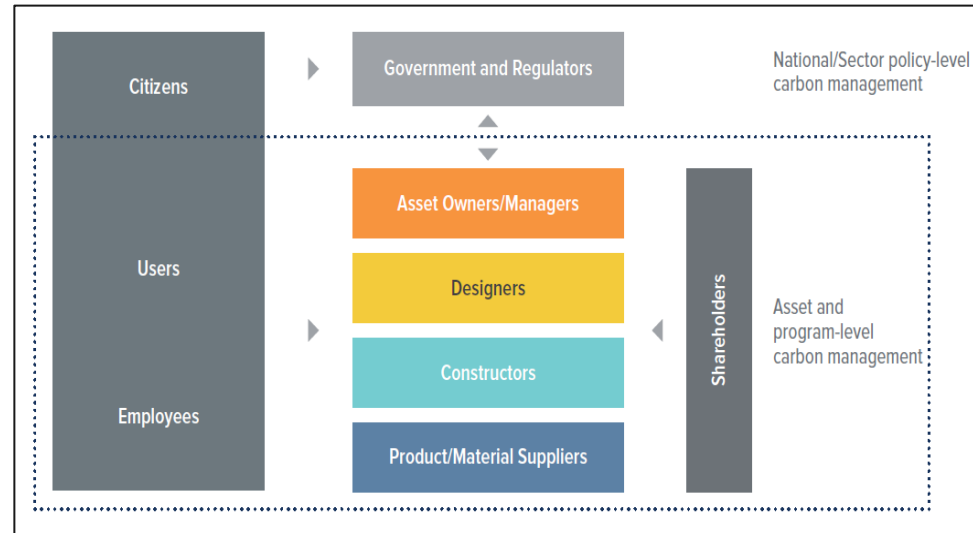
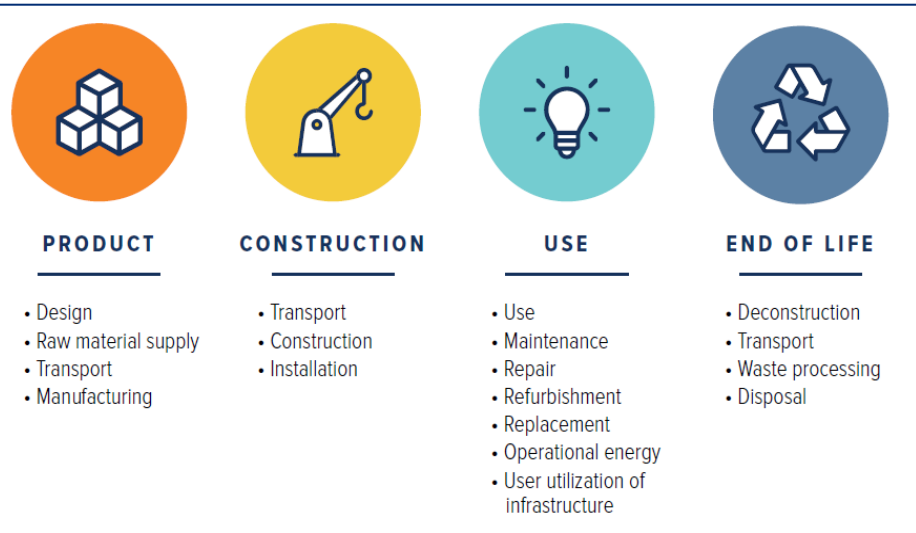
Developing an integrated approach to carbon pricing along the CVC

- This report examines how to design effective carbon pricing mechanisms for the construction industry.
- With increasing construction demand in the future, given population and urbanization trends, there is a need to green this energy-intensive industry.
- The construction value chain is a complex mix of life-cycle stages, delivery models, and stakeholders.
- Putting a price on carbon can be an effective way for governments and organizations to plan for a low-carbon future.

Greening Construction: The Role of Carbon Pricing

- A report published by International Finance Corporation (IFC) and Carbon Pricing Leadership Coalition (CPLC)
- Effective carbon pricing mechanisms for the construction industry
 - Largest consumer of raw materials
 - 25 percent to 40 percent of global GHG emissions.
 - 70–90 percent from materials, 5–15 percent from transportation, and 6–9 percent from energy consumption during construction
- The construction value chain (CVC) is a complex mix of life-cycle stages, delivery models, and stakeholders. Existing definitions of the CVC do not capture the full extent of value chain actors who have control and influence over carbon emissions such as users, financiers, and contracting authorities
- To date, carbon pricing has tended to apply to carbon-intensive production activities. In the CVC, this includes raw material extraction, product manufacture, and energy generation. The study findings suggest that there is no single fix. However, if carbon prices were increased even only to “midpoint” levels of \$25/tCO₂e, then project costs could potentially change behaviors in the CVC in pursuit of life cycle cost and GHG savings. Full report is available here-
https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/climate+business/resources/greening-construction

Defining the Construction Value Chain



- **No standard industry definition of the construction value chain**
- **Multiple actors & stages responsible for carbon management**
- **Fragmented approach to carbon emissions reduction**

Price on Carbon Along the CVC and Impact on Behavior

Extent of influence on actors to reduce emissions



✓ Stage at which CPM is commonly applied

- ACTORS
- Designer
 - Product/Material supplier
 - Developer
 - Investor
 - Asset owner/manager
 - Construction
 - User
 - Demolition/waste mgmt.

	High		Medium		Low							
1. Internal carbon pricing		✓										
2. Emissions reduction credit (ERC) scheme*												
3. Emissions trading systems (ETS)		✓						✓				
4. Hybrid scheme		✓					✓	✓				
5. Carbon tax		✓					✓	✓				
6. Command and control		✓		✓	✓		✓					✓
	A0 Design	A1-A3: Raw Material, Transport, Manufacture	A4 Transport	A5 Constr. – Install.	B1 Use	B2 Maintenance	B3 Repair B4 Replacement B5 refurbish	B6 Operational energy, water	B7 User utilization of infrastructure	C1 Deconstruction	C2-C5 Transport Waste processing Disposal	
	● ● ● ●	● ●	●	●	● ●	●	●	● ●	● ●	● ●	● ●	
	Design (A0)	Product (A1-3)	Construction (A4-5)		Use (B1-7)			End of life (C1-4)				

❑ **Key building material - Cement**

- ❖ Low carbon technology roadmap for Indian Cement Industry
- ❖ Investments based on solid business rationale with payback of 3 to 7 years across Waste heat recovery, Alternative Fuels, Alternate Raw material or blending and Renewables, complimentary to the PAT Scheme
- ❖ End products – Least GHG intensive- Cement, RMC intervention through product eco labels (Greenpro)
- ❖ EDGE rating system for green buildings

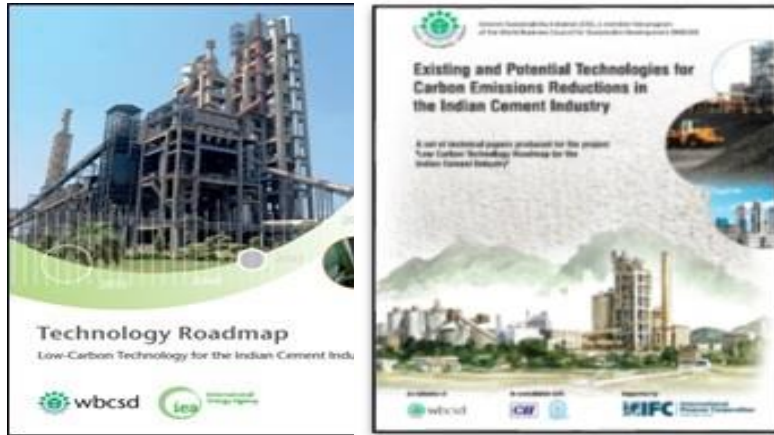
❑ **Financing for real estate developers for affordable green buildings**

❑ **Green Financing Initiatives through FIs**

- ❖ Credit Lines for FIs through Green Bonds to fund climate projects
- ❖ Credit Lines for Housing Finance Companies for funding green buildings

Cement resource efficiency (2013-19) - Outcome & Impacts

Roadmap and Technology Papers



Advisory for 7 clients
Focus: Resource efficiency



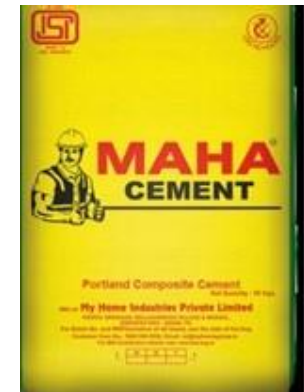
Firm Level direct Impacts

- 350 technical projects and \$96.06m* investments identified
- 508762 tons per annum GHG reduction potential identified
- 190 projects implemented with \$19.79m investment
- 147,409 tons of GHG avoided annually
- 110,000 MWh of energy use avoided annually

Sector level - Indirect Impacts

India:

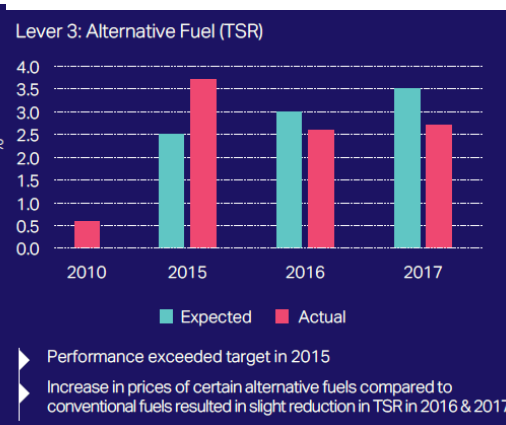
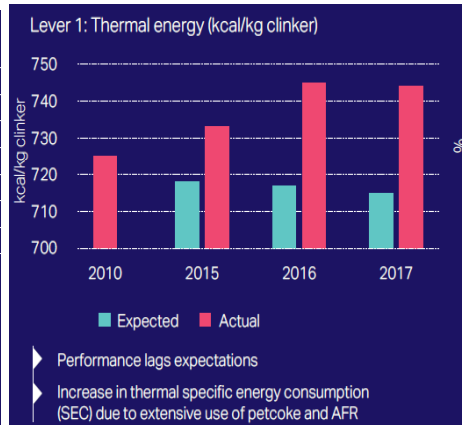
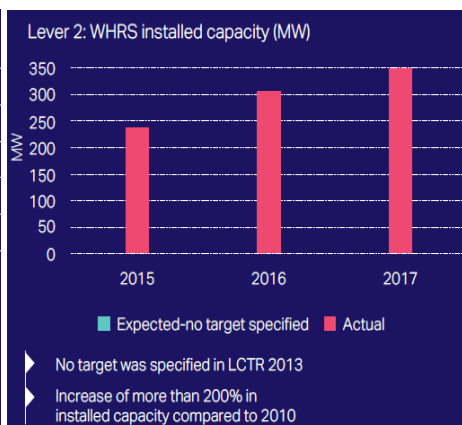
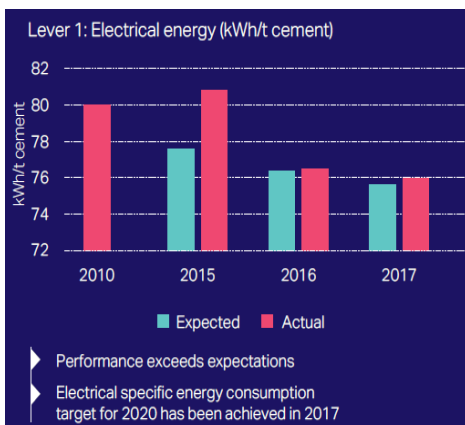
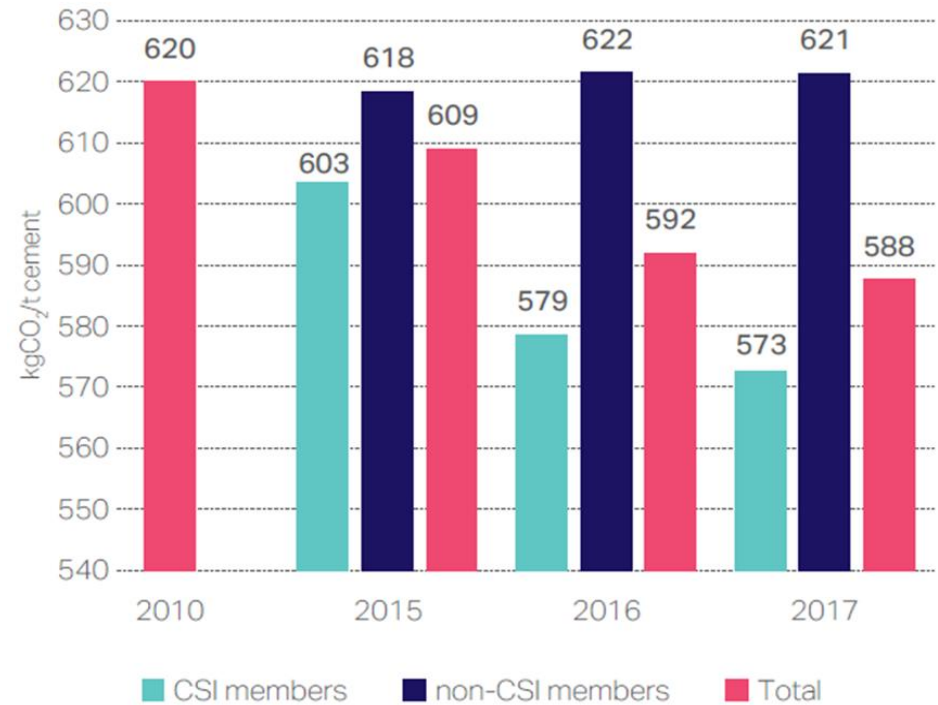
BIS National Standard for composite Cement bought out in 2015 followed by launch of composite cement by My Home Cement and Ambuja Cement



*Investments financed from retained earnings, no IFC financing

Snapshot of progress- Indian Cement Industry between 2010 & 2017

- 5-fold increase in alternative fuel consumption (1.5 million tones used)
- Global best in energy efficiency
- Sector achieved targets for 2020 in 2017
- Progress beyond 2030 looks challenging



First Ecolabel Scheme for Ready Mix Concrete (RMC) in Partnership with Industry

Objective: facilitate market transformation through-

- Development of industry led ecolabel - GreenPro certification for ready mix concrete
- Facilitate adoption of 'GreenPro' by at least 6 RMC manufacturers
- Influence buyer's behavior working with at 10 real estate developers / infrastructure developers

Rating Framework to enable GHG emissions reduction (embodied) in RMC by reduction of clinker in Ordinary Portland Cement (OPC), replacing with SCMs such as fly ash/GGBC, resulting in embodied GHG footprint reduction in end use of RMC by at least 10-12%

RMC market transformation project launch on 6th Oct'17, Jaipur



RMC standard launched in Pune May 2019, Initial certifications awarded



Project Partners



Confederation of Indian Industry



Supported by



Creating Markets, Creating Opportunities

Existing Clients

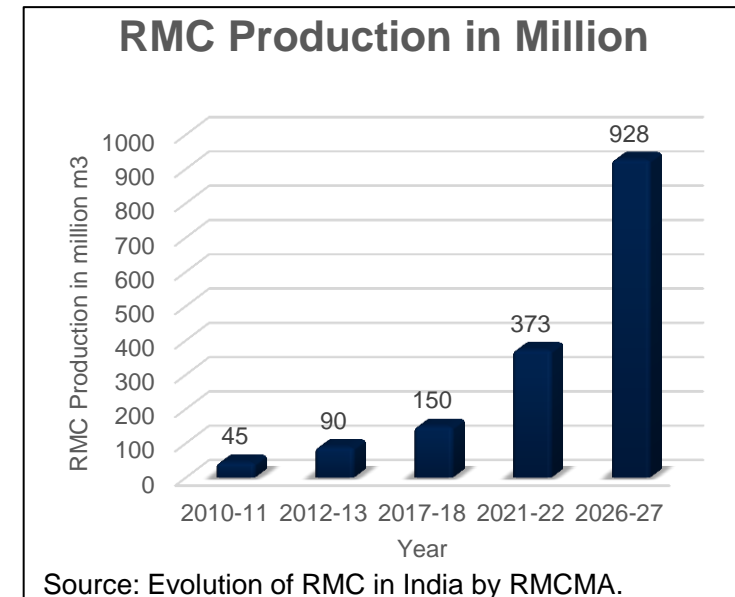


GreenPro Certification Standard for
"Ready Mix Concrete"
Pilot Version - 1

Anticipated Project Impact

Consumption of Ready Mix Concrete on increasing trend

- Ready Mix Concrete consumption
 - 2010-11 : 40 – 45 million m³
 - 2012-13 : 85 - 90 million m³
 - 2017-18 : 145-150 million m³ (Expected)
- Projected growth for next 5 years : 20 - 25 % YoY
- 3rd largest organised concrete industry in the world



Source: Evolution of RMC in India by RMCMA.

Assumption : Projected growth scenario of 20% YoY for next 10 years

Anticipated Impact:

- Over a longer period, the project would contribute towards achieving significant GHG reduction from RMC production.
- With respect to the current production at ~150 Million tons a year, associated GHG emission is ~ 20 Million tons a year whereas with 20% OPC replacement by additives in RMC presents an opportunity for 3 Million tons of GHG reduction potential
- With the envisaged outcome of the project with 150,000 tons of GHG reduction a year from RMC production, projects seeks to addresses 5% of RMC market in terms of GHG reduction potential

Green buildings have a strong business case for banks

Indian Banks and FIs to consider financing Green RMC manufacturing as Climate Finance, use of green RMC as a condition for real estate developers for lending/financing real estate/construction/infrastructure projects

FACTOR*	Description
MARKET SHARE GROWTH	<ul style="list-style-type: none">Market differentiation in competitive housing marketsEntry into specific sectorsInnovator reputation, enhanced corporate social responsibility
HIGH CROSS-SELL AND LOYALTY	<ul style="list-style-type: none">Opportunity for cross-sellingOffer larger loan volumes for buyersStrong retention rates
STRONG SAVINGS PROPENSITY	<ul style="list-style-type: none">Green customers save and increase disposable income through:<ul style="list-style-type: none">lower utilities bills due to saving in energy and waterlower maintenance costs due to more sustainable materials used
POSITIVE RISK BEHAVIOR	<ul style="list-style-type: none">Higher collateral due to higher homes valuesLower D/I ratios with higher disposable incomeOffer a larger loan while maintaining the same LTV and D/I ratiosDefault rates are lower than standard mortgage customers
POSITIVE BRANDING	<ul style="list-style-type: none">Reduced carbon footprint for increasingly sensitive borrowersEnhanced brand reputation as an innovative and socially responsible bankPR opportunities & powerful marketing tools as a provider of “green” products

* - Source: IFC Analysis

ASSESS MARKET POTENTIAL & PIPELINE

- IFC helped the bank assess market potential: IFC helped identify 50x more supply of green home
- IFC helped the bank pitch to existing clients about going green
- IFC introduced the bank to new clients, forward-thinking developers

STRUCTURE INVESTMENT

- Brand enhancement pre IPO
- \$75 million investment via a secured non-convertible debenture (green bond)
- IFC fully subscribed to the issuance

TRAINING ON GREEN CRITERIA

- IFC provides ongoing training to the Bank's developer clients on EDGE certification system in case of interest. Proceeds will be exclusively used for on-lending to developers of green residential buildings with green certification.
- Similar discussions with 2 other HFCs

SUPPORT DEVELOPERS

Sustainable Housing Leadership Consortium (SHLC)

Leveraging the Power of Partnerships

Objective: Convened a voluntary, collaborative effort industry-led SHLC to drive sustainability in India's housing market which aims to achieve nearly 20 percent of country's new housing developments to be green by 2022. Founding members include **Godrej Properties Limited, Mahindra Lifespace Developers Limited, Shapoorji Pallonji Real Estate, Tata Housing Development Company Limited, and VBHC Value Homes Private Limited.**



Achievements

- Structured a workplan around policy, technology & skilling, consumer awareness
- Stakeholder consultations with MCGM and BDA
- Identified technologies for scale up - GFRG, 3D Precast, RCB
- Commenced the first of its kind Post Occupancy Evaluation

Planned Activities

- Approval on enabling environment for green housing/buildings
- Finalize pilot projects and financial models for technology scale up
- Implement a skilling/upskilling plan focus on Gender in Green Buildings
- Undertake the mass consumer awareness campaign partnering with NHB and MHUA on Green Homes

Challenges

- Approval on enabling environment for green housing/buildings
- Pilot project implementation

SHLC Levers & Affordable Housing

SHLC Levers

- SHLC Policy Lever - Improving Enabling Environment for Green Homes
- SHLC Technology & Skilling Lever - Improving the Business Case for Green Homes
- SHLC Consumer Awareness Lever - Raising Consumer Awareness for Buying Green

Scale-Up Delivery of Government's Housing for All

Program- Develop Value Proposition for Green Affordable Housing

Objective

- Provide expert advisory to MoHUA on developing a value proposition for scaling up PMAY and green affordable housing in India

Achievements

- Structured a workplan in consultation with MoHUA
- Commenced stakeholder consultations with affordable housing developers
- Working on identifying key technologies for green affordable housing
- Developed a brochure for value proposition of green affordable housing
- Working with NHB and AFD in consumer awareness on green homes

Planned Activities

- Approval on enabling environment for green housing/buildings
- Finalize pilot projects and financial models for technology scale up
- Support the Global Housing Technology Challenge

Challenges

- Approval on enabling environment for green housing/buildings
- Structuring projects
- Pilot project implementation

Challenges

- ❖ **Adaptation Vs Mitigation – Allocation of resources**
- ❖ **Lack of clarity on any carbon pricing mechanisms – National and international**
- ❖ **Influence of construction value chains is different with different GB rating systems**
- ❖ **FIs - Lack of capacity across the value chains**
- ❖ **Deterrents to actual and effective price discovery – Products and services; Rated commercial space has a premium but not rated residential developments**
- ❖ **EE / ESCOs - Lack of aggregators especially in private sector with some scale, No uptake of Asset management / OPEX models**
- ❖ **Stand alone EE / Climate change deals – Lack of pipelines, has be considered as part of the bigger deal package for green field / brown field deals**



Climate Finance- South Asia

Some of the major clients from SA include-

- Jain Irrigation (IND)- operates in Micro Irrigation Systems
- Ecolibrium energy (IoT) – Equity
- Infuse cleantech funds
- DCM TCCL Green Bond (IND)- NBFC
- DCM ABFL Green Bond (IND)- NBFC
- DCM PNB HFL Bond (IND)
- Ashiana (IND)- Housing/Green Buildings
- JK Paper III (INDIA)– producer of office papers and paper products
- BMM Cement (Sagar cement)
- Clean Max Equity (India) – RESCO- Solar power/clean energy
- Rewa Actis (India)- RESCO- Solar power/clean energy
- Rewa ACME (India) - RESCO- Solar power/clean energy
- Rewa Mahindra (India)- RESCO- Solar power/clean energy
- Azure RG (India)- RESCO- Solar power/clean energy
- Shapoorji Pallonji and Company Limited (affordable housing platform)
- Lithium Urban Tech (India)- employee transportation, E mobility
- Deepak Fertilizers
- Piramal Capital and Housing Finance (NBFC)
- Signature Global (Developer)
- IBRD – PRSF scheme with SIDBI

Thank You!

