



BUILDING BRICKS

SECURITIZED-CARBON AND KILN LOAN FUND

**THE AQI IN DELHI IS 200 ON A
GOOD DAY**

**ANYTHING ABOVE 25 IS DEEMED
UNSAFE BY THE WHO**



**0/500 DAYS WITH
<25 PM 2.5 AQI
THE TIME TO ACT
IS NOW**



INDIA IS FACING A **CLIMATE & AIR EMERGENCY**

POISON IN THE AIR

Indian cities among the world's most polluted cities

22/30

PM 2.5 concentration in New Delhi vis-à-vis WHO norms

14x

North Indians exposed to extreme levels of air pollution

480 mn

AQI in many Indian cities during the winter season

999

Deaths due to air pollution annually

1.2 mn

Reduction in life expectancy in the North due to air pollution

9 years



CLIMATE ON THE EDGE

2.1° C

Warming in the Himalayas even if Paris targets are met

\$ 165 bn

Damage due to sea-level-rise alone by 2050

1/3rd

Glaciers in the Himalayas to melt by the century's end

20%

of the world's population to face water insecurity

35° C

Wet-bulb temp., considered unsurvivable, likely to be breached

30%

of the world's Black Carbon emissions are from India and China

THE BOOMING INDIAN CONSTRUCTION SECTOR

The Indian Real Estate sector is expected to reach a \$1 trillion market size by 2030

13%
GDP share by 2025

Robust Infrastructure Demand



Impact-linked Capital Cost



Derived Demand for Cleaner Inputs

PILLARS OF THE CONSTRUCTION SECTOR – SUPPLY SIDE



CEMENT INDUSTRY

Well-defined

High



High



BRICK INDUSTRY

Scattered

Low



Low



IRON INDUSTRY

Well-defined

High



High

Prospective Regulatory Changes

CHALLENGE

OPPORTUNITY

SOLUTION

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THE INDIAN BRICK INDUSTRY: A SNAPSHOT

Current Demand: 250-300 billion bricks per annum

Demand in 20 years: 750-1000 billion bricks per annum

TECHNOLOGIES FOR CONSTRUCTION OF WALLS

13%: Organised (Masonry + Alternate Walling)



87%: Unorganised Construction (Brick Masonry)

Resource (Clay and Energy)
Inefficient
(84% market)



Emissions
Inefficient
(95% market)

TYPES OF BRICKS

Brick Type	Share	Brick Density	Avg. Specific Manufacturing Energy
Solid Burnt Clay	84%	1600 kg/m ³	2100-3200 MJ/m ³
Perforated Clay		1350 kg/m ³	1600 MJ/m ³
Hollow Clay	1%	800 kg/m ³	1300 MJ/m ³

Non-Fired Bricks (fly ash, cement, AAC) comprise a 15% share

PROMINENT BRICK KILN TECHNOLOGIES IN INDIA

Kiln Type	Share	PM Emissions	Carbon Emissions
Clamp Kiln	25%	2419 g/m ³	0.25 tCO ₂ /m ³
FCBTK Kiln	70%	1888 g/m ³	0.20 tCO ₂ /m ³
ZigZag Kiln	3%	350 g/m ³	0.15 tCO ₂ /m ³
Tunnel Kiln	2%	178 g/m ³	0.12 tCO ₂ /m ³

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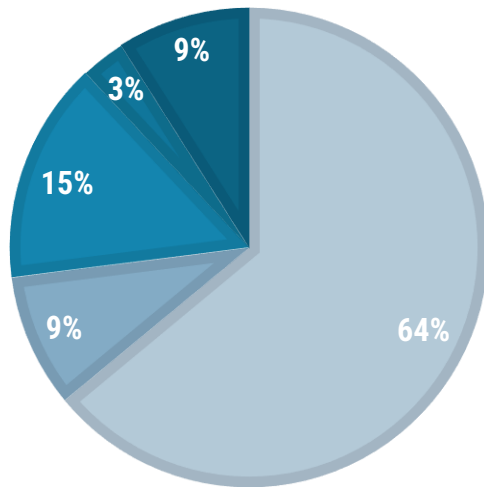
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BURNT CLAY BRICKS REIGN SUPREME IN INDIA

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URBAN HOUSEHOLDS - PREDOMINANT MATERIAL FOR WALLS

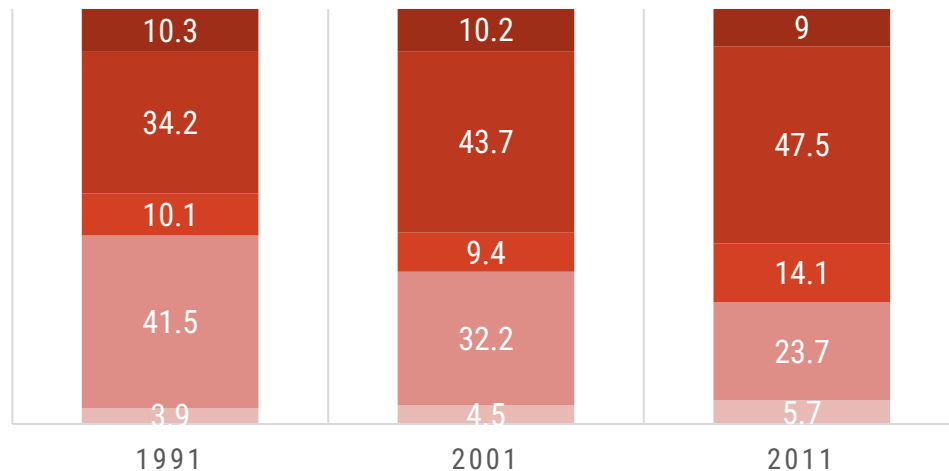
■ Burnt Brick ■ Mud Brick ■ Stone ■ Biomass Material ■ Others



Urban households continue to rely on burnt clay bricks, as the market for 'other' types of bricks remains non-existent

URBAN + RURAL HOUSEHOLDS – PREDOMINANT WALLING MATERIAL

■ Biomass Materials ■ Mud Bricks ■ Stone ■ Burnt Bricks ■ Others



Urbanization and rural development are driving the shift from mud-bricks to burnt clay bricks, pushing up the national share

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INDIA NEEDS CLEAN AND EFFICIENT BRICK KILNS

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The 'Clay Brick' segment is a major driver of the Indian Brick Industry and also of environmentally damaging activities

ENVIRONMENTAL & SOCIAL CONCERNS

9% OF THE TOTAL BLACK CARBON EMISSIONS

Black Carbon, a short-lived climate pollutant, has 900 times stronger warming effect than CO₂. It worsens the air quality and increases the PM 2.5 concentration.

AIR POLLUTANTS

Pollutants like PM 2.5, PM 10, SO₂, CO are the by-products of the brick firing process, worsening the already alarming air pollution levels in adjoining cities.

SOIL DEGRADATION

Good quality agricultural topsoil is used for brick production. 750 MT of clay is consumed each year for the production of burnt clay bricks, making adjoining areas unfertile.

4.11 CO₂ – GDP SHARE RATIO

Kilns emit 66-84 mt CO₂ annually. Kilns' contribution to national CO₂ emissions vis-à-vis their contribution to the GDP stands at 4.11, indicating inefficiency.

CHILD LABOUR

The unorganized and unsupervised nature of kilns allows owners to resort to child labour, exposing children to harsh work conditions and severe health hazards.

THREATENING FOOD SECURITY

Agricultural land in close proximity to kilns has lower Organic Matter (OM) content and its characteristics are unfit to support crop growth, thereby threatening food security.

HEALTH RISK

22%

Kiln workers reported having a chronic cough

21%

Kiln workers reported having a chronic phlegm

17%

Kiln workers identified with Chronic Bronchitis

BARRIERS

HIGH CAPEX NEEDS

Despite the presence of cleaner technology and imminent regulatory threats, kilns are not upgrading due to the high costs involved in upgrading.

FINANCIAL BACKWARDNESS

Being a cash-only business with no formalized financial record-keeping systems and collateral, kilns are excluded from banks' purview of lending money.

FREQUENT SHUT-DOWNS

Temporary restrictions are often imposed on polluting kilns to curb air pollution, denting their revenue stream and their ability to finance technological reforms.

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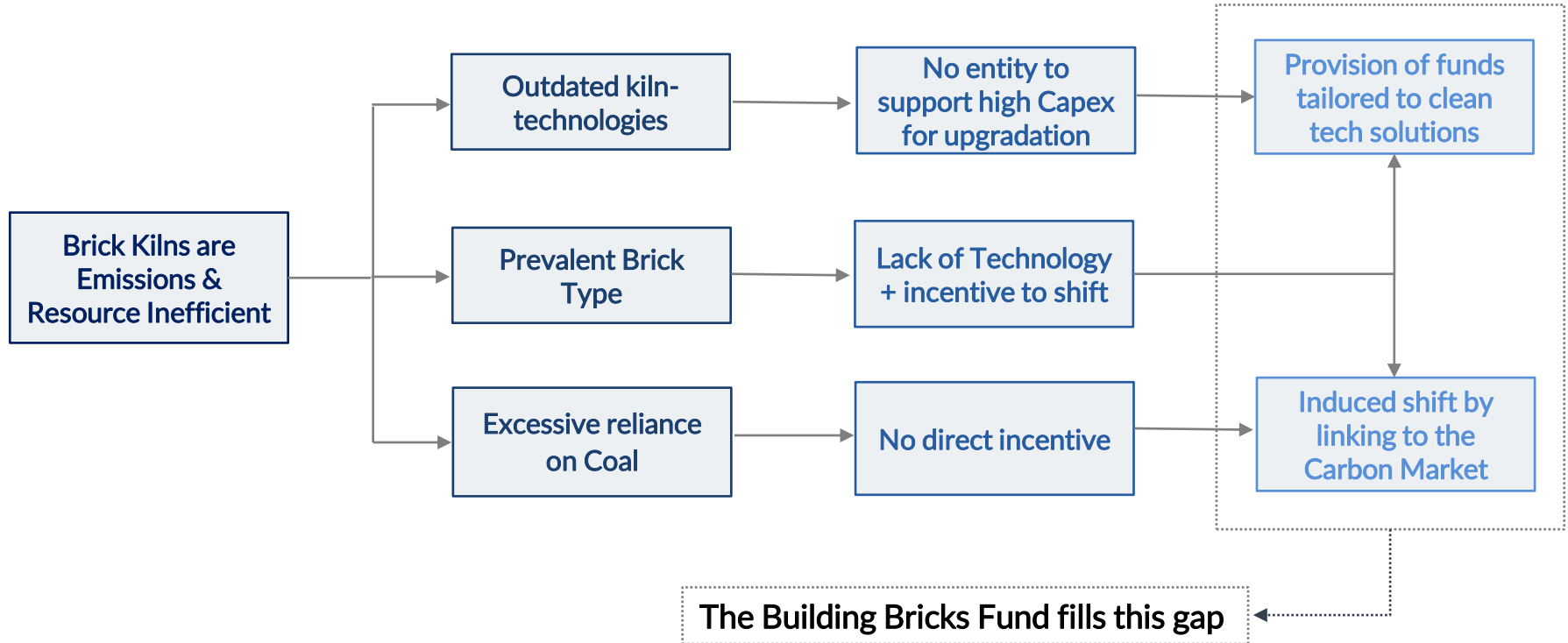
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PROPOSED INTERVENTIONS

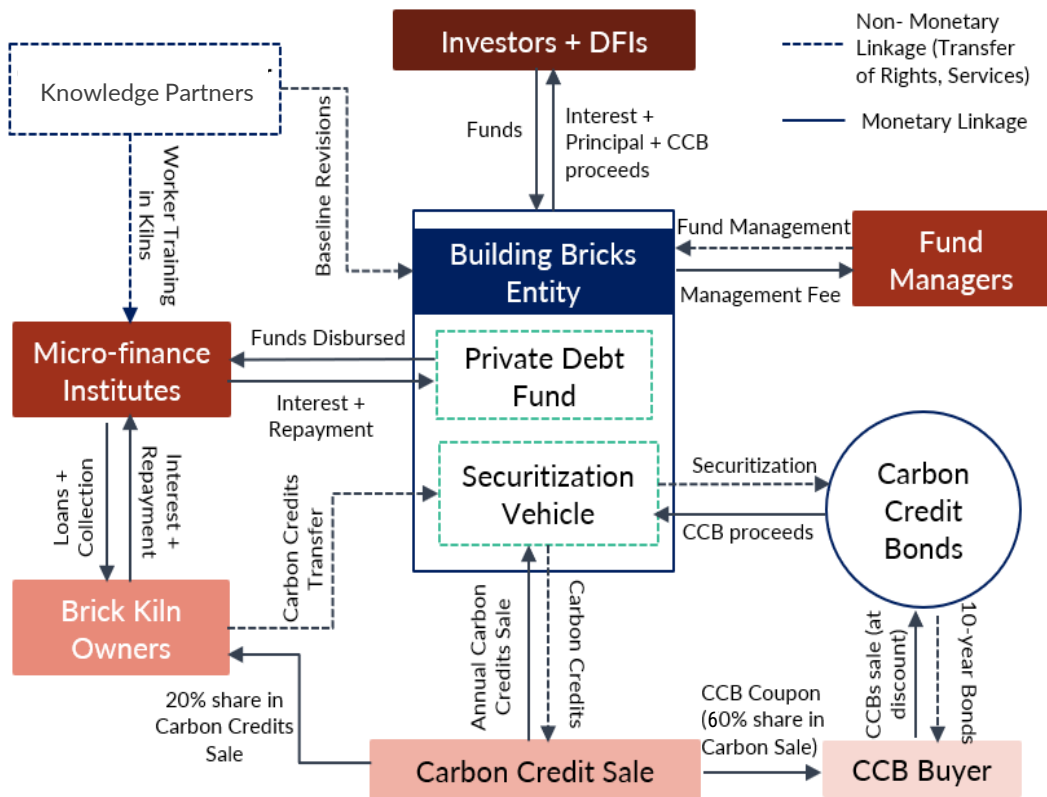
WE AIM TO ENCOURAGE A COMPREHENSIVE SHIFT RATHER THAN INCREMENTAL CHANGES

THE PROBLEM → UNDERLYING REASONS → DRIVING FACTORS → INTERVENTION



BUILDING BRICKS FUND: OUR SOLUTION

FUND STRUCTURE



FUND HIGHLIGHTS

TARGET RETURN: 14% NET IRR



Structure: \$500 million LP; 20 Y lifetime closed-end fund; \$1 million investor buy-in



Development Finance Leverage: 3:2

DFIs: Borrowed Funds

Large Investors: Equity

Indian DFIs: IDBI, IFCI, NABARD

High Net-worth Individuals
Pension Funds

Global DFIs: JP Morgan's DFI, IFC, ADB

Institutional Investors
ESG Funds



Development Finance Guarantee: Mandatory CSR spend by Indian real estate companies to be channelled into the guarantee pool for DFI loans.



Management Income:

1. 1.2% Management Fees (Carbon Credit Sale)
2. 0.5% Credit Restructuring Fees (CCB Sale)

LOAN DISBURSAL VIA MICROFINANCE INSTITUTIONS

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AIM: TO PROVIDE CAPEX LOANS TO KILN OWNERS THROUGH THE MFI NETWORK

WHY COLLABORATE WITH MFIs TO DISBURSE LOANS?



WHAT ARE THE LOAN TERMS?

Loan Amount	\$ 75,000 – \$ 1,000,000 depending on kiln technology
Interest Rate	10 y Indian Govt. Treasury Bond Rate (~6%) + Industry Risk Premium (~3%) + Kiln-specific Risk Premium (technology, collateral)
Duration	10 years
Financial Covenants (kilns)	Carbon Credit transfer over loan term; Maintain >60% productive capacity; Kiln land lease \geq 10 years, Debt Coverage Ratio > 0.9
Impact Covenants (kilns)	Attaining SEC targets and >90% Carbon targets; Gender equality; Zero tolerance to Child Labour

WHAT IS THE FUND BASELINE?

Fund baseline indicates the upper limit of the permissible specific energy consumption for kilns taking loans.

Fund Baseline: 2100 MJ/m³

National Baseline: 2350 MJ/m³

FINANCIAL STAKEHOLDERS

Kilns: Loan Beneficiary

Building Bricks Fund: Interest + 0.6% origination fee + 20% Carbon Credit Sales

Microfinance Partners:

0.4% loan processing commission + 0.5% Intermediation Commission

MICROFINANCE PARTNERS

Partner	Focus
Sahayog Group	West India
Ujjivan Finance	South India
Fusion Finance	North India
Bandhan Bank	East India
Sonata Finance	Women

KNOWLEDGE PARTNERS



1. Pan India network, penetrating every state
2. Better identification of genuine beneficiaries
3. Proven track record in loan recollection
4. Reduced on-field manpower need for the fund
5. Improved surveillance to check fund usage

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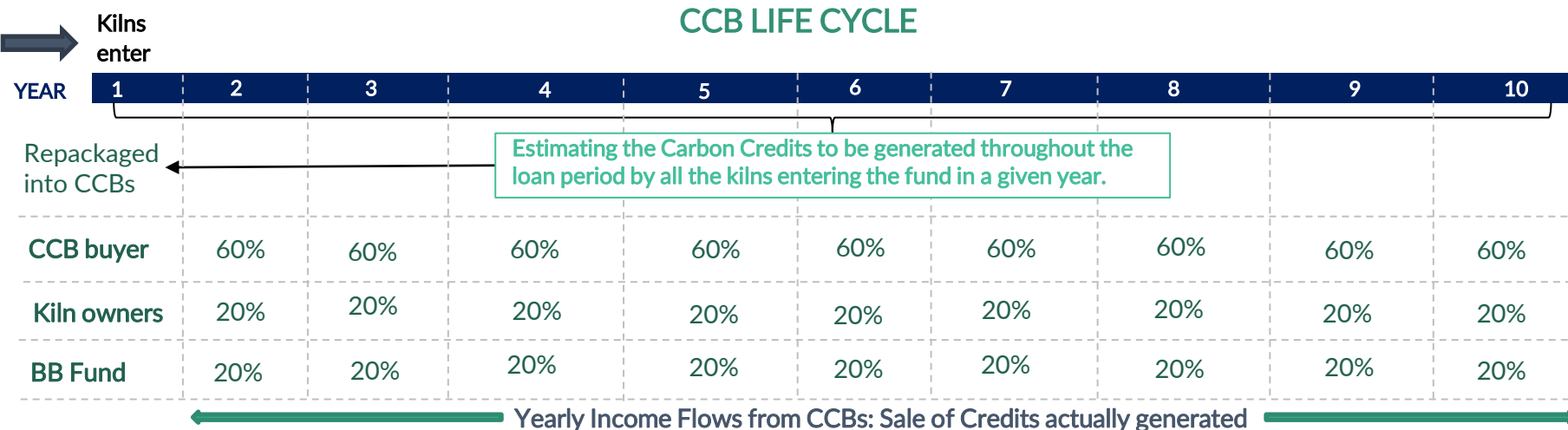
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CARBON CREDIT BONDS: SECURITIZING CARBON CREDITS

AIM: TO INCENTIVIZE KILN OWNERS AND DIVERSIFY CASH FLOWS FOR THE FUND



IRR Potential for CCB owners: 12-46% (depending on carbon prices, with highly conservative prices yielding 12%)

SECURITIZATION BENEFITS

1. Frontloading of invested cash
2. Diversified Cash Streams for the fund
3. Transfer of Price Risk (60%)

BENEFITS OF INCENTIVIZING KILN OWNERS

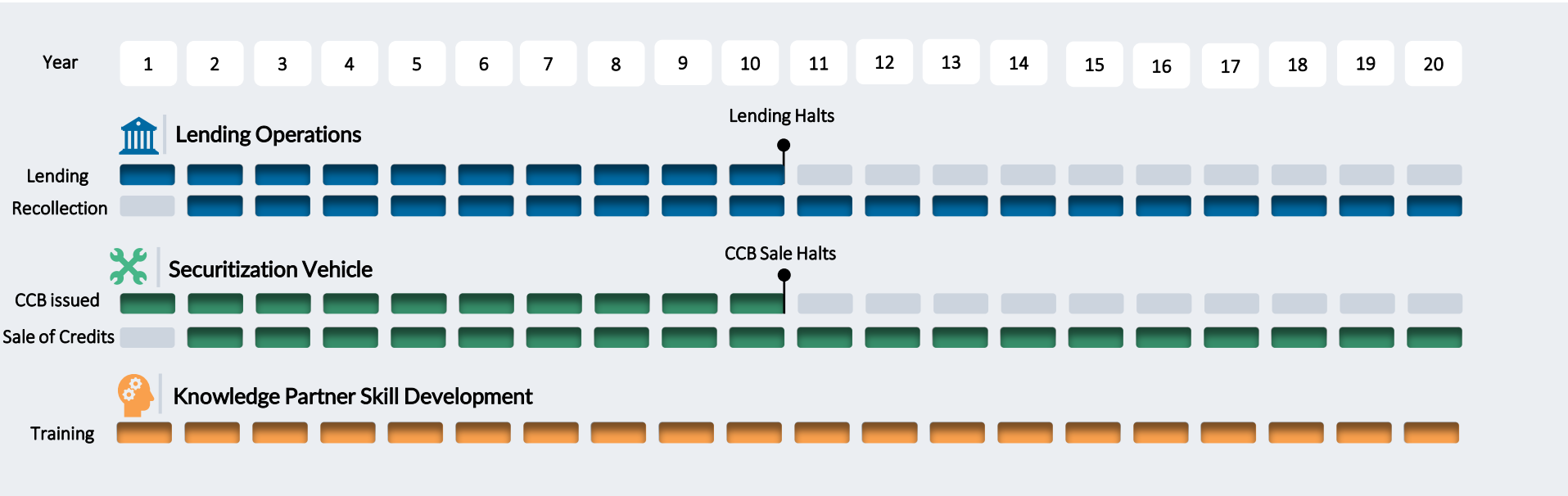
1. Induces voluntary shift from coal to cleaner fuels
2. Promotes adoption of Hollow and Perforated bricks
3. Generates additional cash flows for the kiln

CARBON MARKETS

Registration Methodology: AMS3Z under UNFCCC

To be registered as a Social Project
Target Carbon Markets: Compliance; open to VCS

FUND TIMELINE



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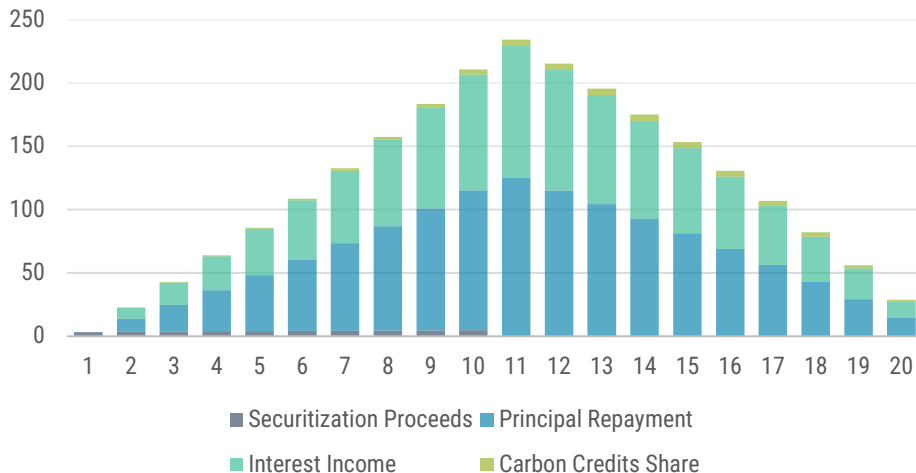
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FUND REVENUES (IN MILLION \$)



Extremely conservative carbon prices have been assumed, the earning potential from them is manifold.

Payback Period (Fund): 11 years

IRR SENSITIVITY

TO CARBON PRICES

Base Case	13.90%	Base Case	13.90%
Rs. 150 (\$2/credit)	13.66%	5% Default	13.51%
Rs. 50 (\$ 0.67/credit)	13.52%	7.5% Default	13.02%
Rs. 400 (\$ 5.33/credit)	14.01%	10% Default	12.49%

TO DEFAULT RATES

ASSUMPTIONS: FUND

- Carbon credit at \$2, growing 5% p.a.
- Weighted Average Tax Rate at 22%
- Delinquency rate at 2.5%
- ₹/\$ Exchange Rate assumed to be 75

KILN CASH FLOWS

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Unit Economics Breakdown (per brick)	Zigzag Construction	Tunnel Construction
Loan Size	₹ 50,00,000.00	₹ 7,00,00,000.00
Avg. Selling Price	₹ 3.15	₹ 4.20
Raw Material	₹ -0.35	₹ -0.40
Cost of Operations (including land)	₹ -0.65	₹ -1.00
Fuel	₹ -0.70	₹ -0.80
Administrative Overheads	₹ -0.18	₹ -0.75
Brick Wasting Losses	₹ -0.15	₹ -0.10
Contribution (per brick)	₹ 1.13	₹ 1.15

Profit & Loss

Production Capacity	6000000	20000000
Productive Capacity	80%	80%
No. of Bricks Fired	4800000	16000000
Realised Income from Sale of Carbon Credits (20% of total)	₹ 45,360.00	₹ 2,34,000.00
Income from Sale of Bricks	₹ 54,00,000.00	₹ 1,84,00,000.00
EBIT	₹ 54,45,360.00	₹ 1,86,34,000.00
Interest Expense (11% and 13%)	₹ -5,50,000.00	₹ -91,00,000.00
Loan Repayment (10% each year)	₹ -5,00,000.00	₹ -70,00,000.00
PAT/EAT	₹ 43,95,360.00	₹ 25,34,000.00
PAT (In USD)	\$ 58,604.80	\$ 33,786.67

ASSUMPTIONS: KILNS

- No taxes under Govt. schemes
- Land is assumed to be leased
- Avg. Selling Price for a 5 pound brick
- ₹/\$ Exchange Rate assumed to be 75

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BUILDING BRICKS FUND: DIRECT IMPACT

QUANTIFIED IMPACT (SAVINGS)

SAVINGS OF

EQUIVALENT TO

53 Mt CO ₂	=	11.6 MILLION CARS
6.1 Mt CO	=	14% US CO EMISSIONS
3.5 Mt SO ₂	=	16% OF INDIAN ELECTRICITY DEMAND
5.4 Mt SPM	=	5.8X CANADIAN PM 2.5 EMISSIONS
268 Mt Soil	=	120X UK SOIL EROSION

IMPACT THROUGH SDG CONTRIBUTIONS



Through employment generation and skill development in an industry that drives the construction sector.



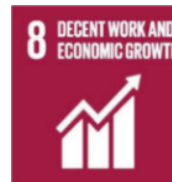
Through the promotion of newer technologies and more efficient brick types to induce a systematic change in the industry.



By tackling pollution via a shift to cleaner kiln technologies, leading to significantly better health outcomes.



By tackling the triple threat of Climate Warming, Land Degradation and Air Pollution.



Worker upskilling along with support to brick kilns to serve the growing needs of the construction sector shall foster growth.



Through the creation of partnerships among social enterprises, MFIs, Carbon Markets, investors, and Brick Kiln owners.

DIMENSIONS
TOUCHED

AIR QUALITY

CLIMATE
CHANGE

SOIL
EROSION

PUBLIC
HEALTH

CHILD
RIGHTS

MSME
EMPOWERMENT

SUSTAINABLE
DEVELOPMENT

CHALLENGE

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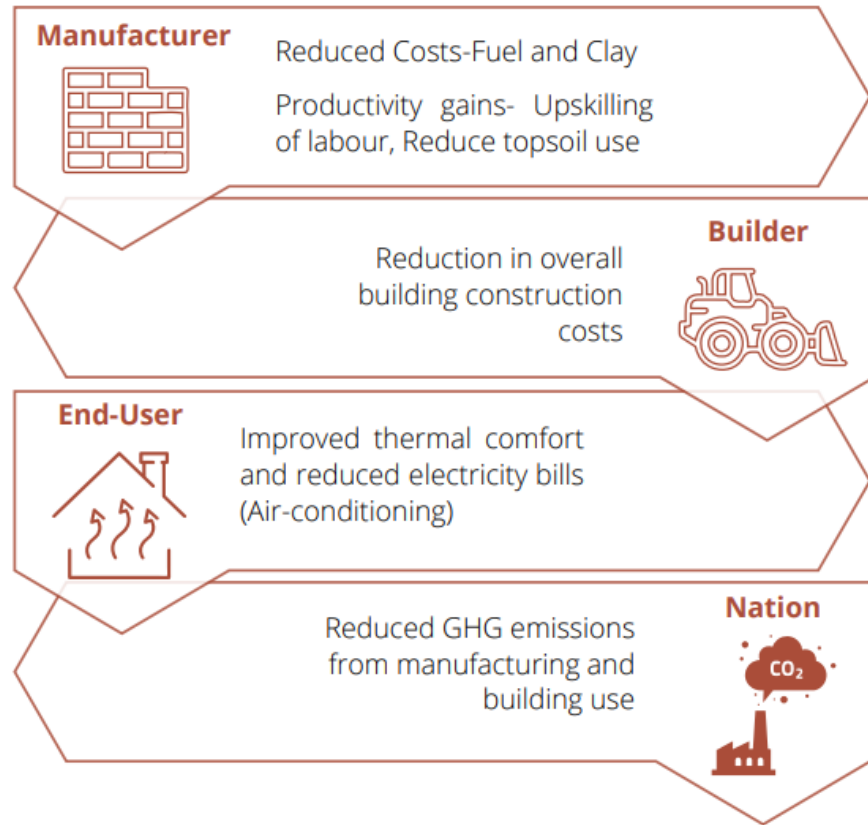
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IMPACT ACROSS THE VALUE CHAIN: INDIRECT IMPACT

Perforated bricks possess lower thermal conductivity values, implying lower heating/cooling energy requirements for homeowners

Consider a hypothetical residential building with 10 floors, 6 flats per floor, and an area of 100 m² per floor constructed using Hollow bricks of the Tunnel Kiln. The estimated benefits over the baseline FCBTK solid burnt clay are:

Parameter	Savings (60 flats)	Beneficiary
Manufacturing Energy Savings (MJ)	2,583,000	Manufacturer
Electricity Consumption Reduction (kWh/year)	74,760	End-User
Reduction in weight of walls (ton)	2,220	Contractor
Construction Cost Reduction	1.5%	Contractor
Energy Savings (tonnes of coal equivalent)	1,760	Nation
Reduction in GHG (tCO ₂)	3,300	Nation
Clay usage reduction	40-70%	Nation



MARKET TRANSFORMATION BENEFITS

RISKS AND MITIGATION STRATEGIES



Risk	DEFAULT ON LOANS	NON-GENERATION OF IMPACT	VOLATILE CARBON PRICES	BETTER KILN TECHNOLOGY	DEMAND FOR BRICKS	REGULATORY & POLICY RISK
Mitigation Strategy	<p>FUND-SPECIFIC Internal Underwriting Facility: Guarantee Fund from CSR contributions</p> <p>KILN-SPECIFIC Provision of equity (in kilns) to the fund in multiples of 3%</p>	<p>FUND-SPECIFIC GeoAI to identify polluting kilns On-ground MFI disclosure reports</p> <p>KILN-SPECIFIC Share in actual sale of carbon credits to induce compliance</p>	<p>DOWNSIDE RISK Securitization of carbon credits to frontload carbon credits earnings from carbon credits</p> <p>HARNESSING UPSIDE 20% share in proceeds from credits to selectively retain the upside</p>	<p>FUND-SPECIFIC Loan disbursal criteria linked to specific-energy need, not technology</p> <p>KILN-SPECIFIC Provision of loans for any further enhancements</p>	<p>FUND-SPECIFIC Untapped rural brick market to be leveraged The fund can tap large orders for its kilns.</p> <p>KILN-SPECIFIC Fund/Technology partners' guidance to minimize inventories and transition smoothly</p>	<p>FUND-SPECIFIC Stringent SEC baseline to immunize the fund from subsequent revisions by the Govt.</p> <p>KILN-SPECIFIC Registration and greater formalization along with stringent emission and social protocols</p>

OUR TEAM

IMPACT LEAD



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SPECIAL THANKS TO

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Shuvendu Bose

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Development Financier

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Social Impact at Kellogg

Megan Kashner

Social Impact at Kellogg

Ashish Kulkarni

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Orrick

Srihari Adurty

Fundscorner

Devin Rapson

Social Impact at Kellogg



THANK YOU! ANY QUESTIONS?

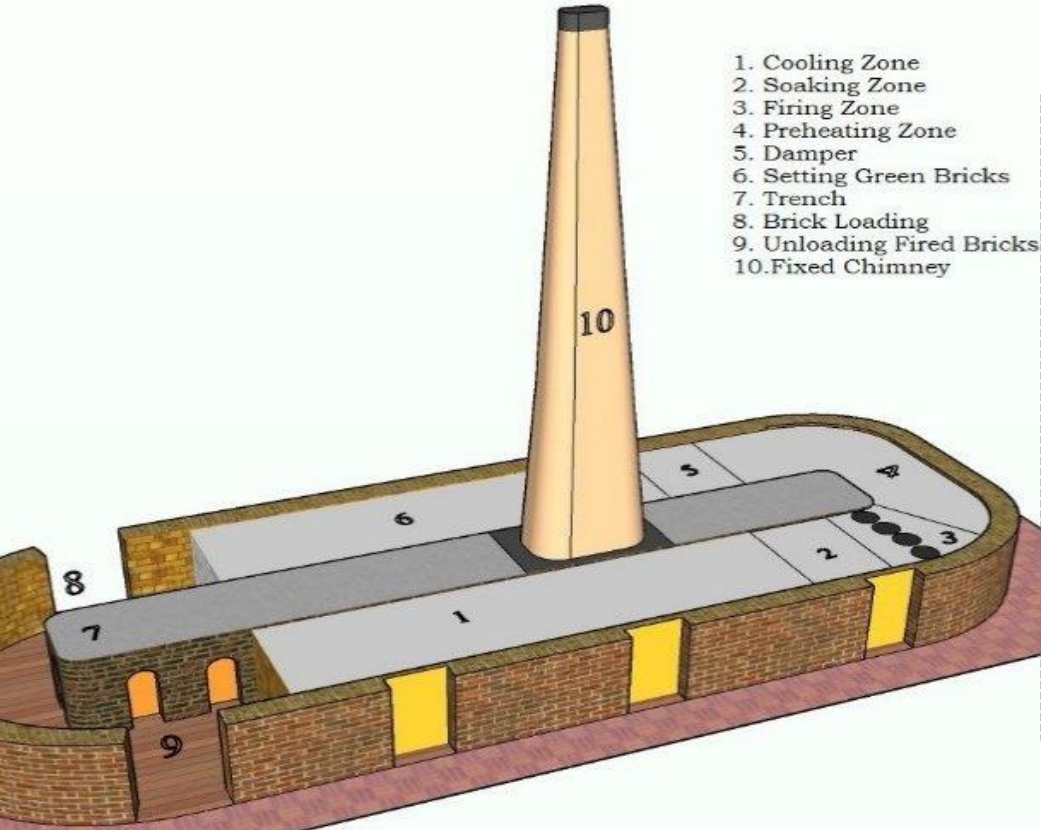


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HOW ARE BRICKS MANUFACTURED?

FCBT KILN PRODUCTION CYCLE:



PRODUCTION PROCESS:



Clay Preparation



Shaping



Drying



Firing & Cooling

DIFFERENT BRICK KILN TYPES

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CLAMP KILN



FCBT KILN



ZIGZAG KILN



VERTICAL SHAFT KILN



DOWN DRAUGHT KILN



TUNNEL KILN

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SCALABILITY AND REPLICABILITY

PILOT:

Total Addressable Market (brick kilns) in India: INR 365 billion or USD 4.87 billion, growing at 5% p.a.

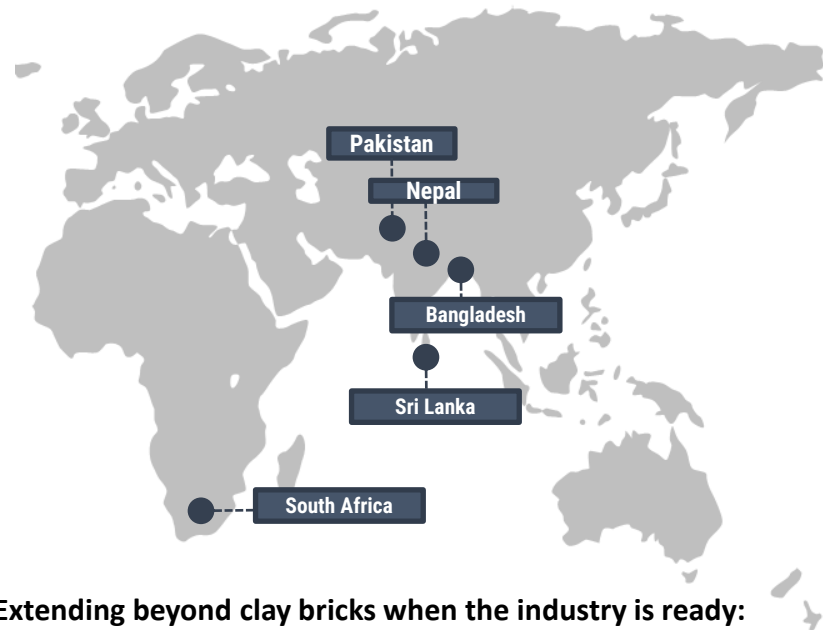
The fund will be launched in **50 districts** across the states of **U.P.** and **Bihar**, with ~30% of total brick kilns in India



A phased nationwide rollout in 4 states every 6 months shall be done as Microfinance Institutes keep joining the fund and expand their reach

PROSPECTIVE EXTENSIONS:

Geographical Extension:



Extending beyond clay bricks when the industry is ready:

1. Alternate Walling Systems
2. Recycled waste raw material
3. Non-clay input mixes

FUND CASH FLOWS (Y1-Y10)												24
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10		
Investor Infusion	₹ 37,50,00,00,000.00											
Loan Disburseals net of 1% Origination fee (in million Rs.)	₹ -7,73,19,00,000.00	₹ -8,01,20,70,000.00	₹ -8,30,41,20,000.00	₹ -8,74,36,80,000.00	₹ -9,10,30,50,000.00	₹ -9,46,24,20,000.00	₹ -9,82,87,20,000.00	₹ -10,19,50,20,000.00	₹ -10,63,55,70,000	₹ -11,07,81,00,000		
Gross Proceeds from Securitization (including 0.5% Restructuring Fee)	₹ 23,86,22,466.26	₹ 25,27,72,525.64	₹ 26,78,85,467.09	₹ 28,52,72,922.21	₹ 29,49,57,320.66	₹ 30,46,41,719.11	₹ 31,49,68,038.95	₹ 32,52,94,358	₹ 33,65,97,455	₹ 34,82,21,512		
Principal Repayment	₹ -	₹ 78,10,00,000.00	₹ 1,59,03,00,000.00	₹ 2,42,91,00,000.00	₹ 3,31,23,00,000.00	₹ 4,23,18,00,000.00	₹ 5,18,76,00,000.00	₹ 6,18,04,00,000.00	₹ 7,21,02,00,000.00	₹ 8,28,45,00,000.00		
Interest Income	₹ -	₹ 64,95,00,000.00	₹ 1,32,08,50,000.00	₹ 2,01,48,50,000.00	₹ 2,74,46,50,000.00	₹ 3,50,51,00,000.00	₹ 4,29,62,00,000.00	₹ 5,11,84,00,000.00	₹ 5,97,17,00,000.00	₹ 6,86,27,50,000.00		
Revenue from CDM/VCS/ISO (20% of overall sales)	₹ -	₹ 1,28,80,500.00	₹ 2,91,77,280.00	₹ 4,95,91,698.75	₹ 7,50,46,438.50	₹ 10,58,61,567.49	₹ 14,29,31,151.99	₹ 18,73,43,505	₹ 24,02,95,233	₹ 30,32,71,729		
Gross Revenue	₹ 23,86,22,466.26	₹ 1,69,61,53,025.64	₹ 3,20,82,12,747.09	₹ 4,77,88,14,620.96	₹ 6,42,69,53,759.16	₹ 8,14,74,03,286.60	₹ 9,94,16,99,190.94	₹ 11,81,14,37,864.61	₹ 13,75,87,92,688.93	₹ 15,79,87,43,241.60		
Gross Cash Flows	₹ -7,49,32,77,533.74	₹ -6,31,59,16,974.36	₹ -5,09,59,07,252.91	₹ -3,96,48,65,379.04	₹ -2,67,60,96,240.84	₹ -1,31,50,16,713.40	₹ 11,29,79,190.94	₹ 1,61,64,17,864.61	₹ 3,12,32,22,688.93	₹ 4,72,06,43,241.60		
SPV Expenses												
MFI Processing Commission (0.4% of loan amount)	₹ -3,12,40,000.00	₹ -3,23,72,000.00	₹ -3,35,52,000.00	₹ -3,53,28,000.00	₹ -3,67,80,000.00	₹ -3,82,32,000.00	₹ -3,97,12,000.00	₹ -4,11,92,000.00	₹ -4,29,72,000.00	₹ -4,47,60,000.00		
MFI Intermediation Commission (1% on Collections)	₹ -	₹ -1,43,05,000.00	₹ -2,91,11,500.00	₹ -4,44,39,500.00	₹ -6,05,69,500.00	₹ -7,73,69,000.00	₹ -9,48,38,000.00	₹ -11,29,88,000.00	₹ -13,18,19,000.00	₹ -15,14,72,500.00		
Credit Restructuring Fees (0.5% of securitized credit)	₹ -11,87,176.45	₹ -12,57,574.75	₹ -13,32,763.52	₹ -14,19,268.27	₹ -14,67,449.36	₹ -15,15,630.44	₹ -15,67,005.17	₹ -16,18,379.89	₹ 16,74,614.20	₹ 17,32,445.33		
Management Fees (1.2% of credits sold)	₹ -	₹ -15,45,660.00	₹ -35,01,273.60	₹ -59,51,003.85	₹ -90,05,572.62	₹ -1,27,03,388.10	₹ -1,71,51,738.24	₹ -2,24,81,220.70	₹ -2,88,35,428.06	₹ -3,63,92,607.53		
Rating Assessment Fees	₹ -1,20,000.00	₹ -1,20,000.00	₹ -1,20,000.00	₹ -1,20,000.00	₹ -1,20,000.00	₹ -1,20,000.00	₹ -1,20,000.00	₹ -1,20,000.00	₹ -1,20,000.00	₹ -1,20,000.00		
Operating Expenses	₹ -90,00,000.00	₹ -93,60,000.00	₹ -97,34,400.00	₹ -1,01,23,776.00	₹ -1,05,28,727.04	₹ -1,09,49,876.12	₹ -1,13,87,871.17	₹ -1,18,43,386.01	₹ -1,23,17,121.45	₹ -1,28,09,806.31		
Legal and Administrative Expenses	₹ -20,00,000.00	₹ -20,80,000.00	₹ -21,63,200.00	₹ -22,49,728.00	₹ -23,39,717.12	₹ -24,33,305.80	₹ -25,30,638.04	₹ -26,31,863.56	₹ 27,37,138.10	₹ 28,46,623.62		
Total Certification Fees	₹ -2,00,000.00	₹ -5,50,380.50	₹ -2,55,732.80	₹ -2,94,293.00	₹ -3,35,356.00	₹ -3,77,813.00	₹ -4,21,664.00	₹ -4,67,001.40	₹ -5,13,825.20	₹ -5,62,276.00		
Miscellaneous Expenses	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00		
Total SPV Expenses	₹ -4,42,47,176.45	₹ -6,20,90,615.25	₹ -8,02,70,869.92	₹ -10,04,25,569.12	₹ -12,16,46,322.14	₹ -14,42,01,013.47	₹ -16,82,28,916.61	₹ -19,38,41,851.56	₹ -22,14,89,127.02	₹ -25,11,96,258.81		
Net Cash Flows	₹ -7,53,75,24,710.18	₹ -6,37,80,07,589.62	₹ -5,17,61,78,122.83	₹ -4,06,52,90,948.16	₹ -2,79,77,42,562.97	₹ -1,45,92,17,726.87	₹ -5,52,49,725.67	₹ 1,42,25,76,013.05	₹ 2,90,17,33,561.91	₹ 4,46,94,46,982.79		
Net Cash Flows (\$)	\$ -10,05,00,329.47	\$ -8,50,40,101.19	\$ -6,90,15,708.30	\$ -5,42,03,879.31	\$ -3,73,03,234.17	\$ -1,94,56,236.36	\$ -7,36,663.01	\$ 1,89,67,680.17	\$ 3,86,89,780.83	\$ 5,95,92,626.44		
IRR	13.902388%											
Bad Debts (2.5% over first 5 years, 2% afterwards)		₹ -3,57,62,500.00	₹ -7,27,78,750.00	₹ -11,10,98,750.00	₹ -15,14,23,750.00	₹ -19,34,22,500.00	₹ -18,96,76,000.00	₹ -22,59,76,000.00	₹ -26,36,38,000.00	₹ -30,29,45,000.00		
Additional Guarantee (\$10 million)	₹ 75,00,00,000.00	₹ 75,00,00,000.00	₹ 75,00,00,000.00	₹ 75,00,00,000.00	₹ 75,00,00,000.00							
Default Guarantee Fund	₹ 75,00,00,000.00	₹ 1,50,00,00,000.00	₹ 2,25,00,00,000.00	₹ 3,00,00,00,000.00	₹ 3,75,00,00,000.00	₹ 3,59,85,76,250.00	₹ 3,40,51,53,750.00	₹ 3,21,54,77,750.00	₹ 2,98,95,01,750.00	₹ 2,72,58,63,750.00		
Net Provision		₹ 1,46,42,37,500.00	₹ 2,17,72,21,250.00	₹ 2,88,89,01,250.00	₹ 3,59,85,76,250.00	₹ 3,40,51,53,750.00	₹ 3,21,54,77,750.00	₹ 2,98,95,01,750.00	₹ 2,72,58,63,750.00	₹ 2,42,29,18,750.00		
CHALLENGE	OPPORTUNITY	SOLUTION			IMPACT		RISK		APPENDIX			

FUND CASH FLOWS (Y11-Y20)

25

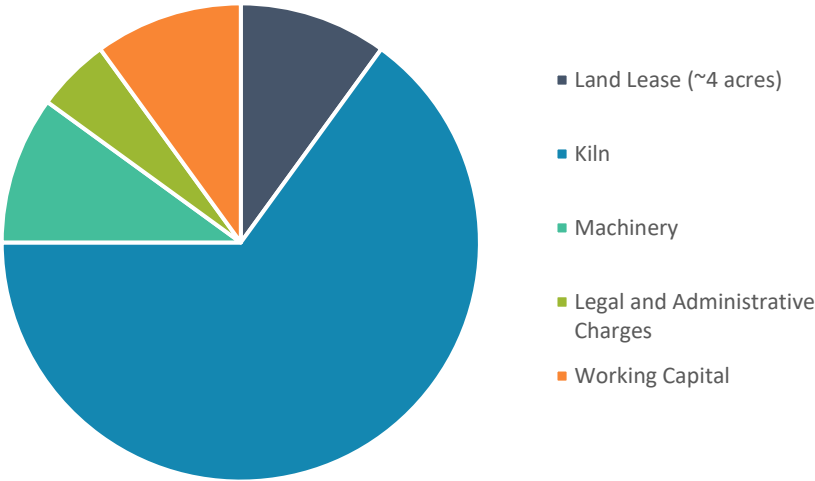
	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20
Loan Disbursals net of 1% Origination fee	-									
Gross Proceeds from Securitization (including 0.5% Restructuring Fee)	-									
Principal Repayment	₹ 9,40,35,00,000.00	₹ 8,62,25,00,000.00	₹ 7,81,32,00,000.00	₹ 6,97,44,00,000.00	₹ 6,09,12,00,000.00	₹ 5,17,17,00,000.00	₹ 4,21,59,00,000.00	₹ 3,22,31,00,000.00	₹ 2,19,33,00,000.00	₹ 1,11,90,00,000.00
Interest Income	₹ 7,79,16,50,000.00	₹ 7,14,21,50,000.00	₹ 6,47,08,00,000.00	₹ 5,77,68,00,000.00	₹ 5,04,70,00,000.00	₹ 4,28,65,50,000.00	₹ 3,49,54,50,000.00	₹ 2,67,32,50,000.00	₹ 1,81,99,50,000.00	₹ 92,89,00,000.00
Revenue from CDM/VCS/ISO (20% of overall sales)	₹ 37,79,20,066.18	₹ 38,23,03,373.04	₹ 38,16,04,930.07	₹ 37,43,83,513.36	₹ 35,86,61,634.87	₹ 33,40,66,403.29	₹ 29,87,81,852.57	₹ 25,05,38,489.72	₹ 18,68,41,274.04	₹ 10,45,06,985.78
Gross Revenue	₹ 17,57,30,70,066.18	₹ 16,14,69,53,373.04	₹ 14,66,56,04,930.07	₹ 13,12,55,83,513.36	₹ 11,49,68,61,634.87	₹ 9,79,23,16,403.29	₹ 8,01,01,31,852.57	₹ 6,14,68,88,489.72	₹ 4,20,00,91,274.04	₹ 2,15,24,06,985.78
Gross Cash Flows	₹ 17,57,30,70,066.18	₹ 16,14,69,53,373.04	₹ 14,66,56,04,930.07	₹ 13,12,55,83,513.36	₹ 11,49,68,61,634.87	₹ 9,79,23,16,403.29	₹ 8,01,01,31,852.57	₹ 6,14,68,88,489.72	₹ 4,20,00,91,274.04	₹ 2,15,24,06,985.78
SPV Expenses										
MFI Processing Commission (0.4% of loan amount)										
MFI Intermediation Commission (1% on Collections)	₹ -17,19,51,500.00	₹ -15,76,46,500.00	₹ -14,28,40,000.00	₹ -12,75,12,000.00	₹ -11,13,82,000.00	₹ -9,45,82,500.00	₹ -7,71,13,500.00	₹ -5,89,63,500.00	₹ -4,01,32,500.00	₹ -2,04,79,000.00
Credit Restructuring Fees (0.5% of securitized credit)										
Management Fees (1.2% of credits sold)	₹ -4,53,50,407.94	₹ -4,58,76,404.76	₹ -4,57,92,591.61	₹ -4,49,26,021.60	₹ -4,30,39,396.18	₹ -4,00,87,968.39	₹ -3,58,53,822.31	₹ -3,00,64,618.77	₹ -2,24,20,952.89	₹ -1,25,40,838.29
Rating Assessment Fees										
Operating Expenses	₹ -1,33,22,198.56	₹ -1,38,55,086.51	₹ -1,44,09,289.97	₹ -1,49,85,661.57	₹ -1,55,85,088.03	₹ -1,62,08,491.55	₹ -1,68,56,831.21	₹ -1,75,31,104.46	₹ -1,82,32,348.64	₹ -1,89,61,642.58
Legal and Administrative Expenses	₹ -29,60,488.57	₹ -30,78,908.11	₹ -32,02,064.44	₹ -33,30,147.01	₹ -34,63,352.90	₹ -36,01,887.01	₹ -37,45,962.49	₹ -38,95,800.99	₹ -40,51,633.03	₹ -42,13,698.35
Total Certification Fees	₹ -5,37,400.00	₹ -5,03,052.00	₹ -4,66,667.20	₹ -4,28,107.00	₹ -3,87,044.00	₹ -3,44,587.00	₹ -3,00,736.00	₹ -2,55,398.60	₹ -2,08,574.80	₹ -1,60,124.00
Miscellaneous Expenses	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00	₹ -5,00,000.00
Total SPV Expenses	₹ -23,46,21,995.08	₹ -22,14,59,951.38	₹ -20,72,10,613.21	₹ -19,16,81,937.18	₹ -17,43,56,881.11	₹ -15,53,25,433.96	₹ -13,43,70,852.01	₹ -11,12,10,422.82	₹ -8,55,46,009.35	₹ -5,68,55,303.23
Net Cash Flows	₹ 17,33,84,48,071.10	₹ 15,92,54,93,421.65	₹ 14,45,83,94,316.85	₹ 12,93,39,01,576.18	₹ 11,32,25,04,753.76	₹ 9,63,69,90,969.34	₹ 7,87,57,61,000.55	₹ 6,03,56,78,066.90	₹ 4,11,45,45,264.69	₹ 2,09,55,51,682.55
Net Cash Flows (\$)	\$ 23,11,79,307.61	\$ 21,23,39,912.29	\$ 19,27,78,590.89	\$ 17,24,52,021.02	\$ 15,09,66,730.05	\$ 12,84,93,212.92	\$ 10,50,10,146.67	\$ 8,04,75,707.56	\$ 5,48,60,603.53	\$ 2,79,40,689.10
Bad Debts (2.5% over first 5 years, 2% afterwards)	₹ -34,39,03,000.00	₹ -31,52,93,000.00	₹ -28,56,80,000.00	₹ -25,50,24,000.00	₹ -22,27,64,000.00	₹ -18,91,65,000.00	₹ -15,42,27,000.00	₹ -11,79,27,000.00	₹ -8,02,65,000.00	₹ -4,09,58,000.00
Additional Guarantee (\$10 million)										
Default Guarantee Fund	₹ 2,42,29,18,750.00	₹ 2,07,90,15,750.00	₹ 1,76,37,22,750.00	₹ 1,47,80,42,750.00	₹ 1,22,30,18,750.00	₹ 1,00,02,54,750.00	₹ 81,10,89,750.00	₹ 65,68,62,750.00	₹ 53,89,35,750.00	₹ 45,86,70,750.00
Net Provision	₹ 2,07,90,15,750.00	₹ 1,76,37,22,750.00	₹ 1,47,80,42,750.00	₹ 1,22,30,18,750.00	₹ 1,00,02,54,750.00	₹ 81,10,89,750.00	₹ 65,68,62,750.00	₹ 53,89,35,750.00	₹ 45,86,70,750.00	₹ 41,77,12,750.00
CHALLENGE	OPPORTUNITY		SOLUTION		IMPACT		RISK		APPENDIX	

BREAKDOWN OF CARBON CREDITS CERTIFICATION FEE

Year	1	2	3	4	5	6	7	8	9	10
Account Opening Fee	₹ -50,000									
Registration Fee	₹ -1,50,000	₹ -75,000	₹ -75,000	₹ -75,000	₹ -75,000	₹ -75,000	₹ -75,000	₹ -75,000	₹ -75,000	₹ -75,000
VCU Issuance Levy		₹ -3,52,500	₹ -44,208	₹ -68,308	₹ -93,973	₹ -1,20,508	₹ -1,47,915	₹ -1,76,251	₹ -2,05,516	₹ -2,35,798
Conversion of GHG Credits		₹ -12,881	₹ -26,525	₹ -40,985	₹ -56,384	₹ -72,305	₹ -88,749	₹ -1,05,751	₹ -1,23,309	₹ -1,41,479
Methodology										
Compensation Fees		₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000
Expert Application Annual Fees		₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000
Validation Body Annual Fees		₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000
Total Certification Fees	₹ -2,00,000	₹ -5,50,381	₹ -2,55,733	₹ -2,94,293	₹ -3,35,356	₹ -3,77,813	₹ -4,21,664	₹ -4,67,001	₹ -5,13,825	₹ -5,62,276
Total Certification Fees (\$)	\$ -2,666.67	\$ -7,338.41	\$ -3,409.77	\$ -3,923.91	\$ -4,471.41	\$ -5,037.51	\$ -5,622.19	\$ -6,226.69	\$ -6,851.00	\$ -7,497.01

Year	11	12	13	14	15	16	17	18	19	20
Account Opening Fee										
Registration Fee					Not Applicable from the 11 th year					
VCU Issuance Levy	₹ -2,67,125	₹ -2,45,658	₹ -2,22,917	₹ -1,98,817	₹ -1,73,153	₹ -1,46,617	₹ -1,19,210	₹ -90,874	₹ -61,609	₹ -31,328
Conversion of GHG Credits										
Methodology										
Compensation Fees	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000	₹ -20,000
Expert Application Annual Fees	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000	₹ -50,000
Validation Body Annual Fees	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000	₹ -40,000
Total Certification Fees	₹ -5,37,400	₹ -5,03,052	₹ -4,66,667	₹ -4,28,107	₹ -3,87,044	₹ -3,44,587	₹ -3,00,736	₹ -2,55,399	₹ -2,08,575	₹ -1,60,124
Total Certification Fees (\$)	\$ -7,165.33	\$ -6,707.36	\$ -6,222.23	\$ -5,708.09	\$ -5,160.59	\$ -4,594.49	\$ -4,009.81	\$ -3,405.31	\$ -2,781.00	\$ -2,134.99

Estimate on Loan Utilization (For setting up a new zigzag kiln):



Yearly Uptake of Loans (Expected)

Uptake	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total Kilns
Zigzag Construction	350	371	394	418	431	444	458	472	487	502	3977
Zigzag Renovation	230	249	269	291	300	309	319	329	339	350	2755
Tunnel Construction	80	82	84	88	92	96	100	104	109	114	869

CARBON CREDIT BONDS VALUATION

NPV VALUATION: 60% OF NEW CREDITS EXPECTED

Year	1	2	3	4	5	6	7	8	9	10
Value of new credits (annually)	₹ 64402500	₹ 68221500	₹ 72300375	₹ 76993125	₹ 79606875	₹ 82220625	₹ 85007625	₹ 87794625	₹ 90845250	₹ 93982500
Discounted value of credits over 10 years	₹ 39,57,25,483	₹ 41,91,91,584	₹ 44,42,54,505	₹ 47,30,89,423	₹ 48,91,49,785	₹ 50,52,10,147	₹ 52,23,35,056	₹ 53,94,59,964	₹ 55,82,04,734	₹ 57,74,81,778
CCB Value	₹ 23,74,35,289	₹ 25,15,14,950	₹ 26,65,52,703	₹ 28,38,53,653	₹ 29,34,89,871	₹ 30,31,26,088	₹ 31,34,01,033	₹ 32,36,75,978	₹ 33,49,22,840	₹ 34,64,89,066
CCB Pool Value (\$)	\$ 31,65,803	\$ 33,53,532	\$ 35,54,036	\$ 37,84,715	\$ 39,13,198	\$ 40,41,681	\$ 41,78,680	\$ 43,15,679	\$ 44,65,637	\$ 46,19,854

Discount Rate: 10%

CCB Pool Value = 60% of the NPV of Carbon Credits over 10 years

SALE OF CCBs



CCBs shall be sold to prospective buyers, post securitization, via Bond Purchase Agreements



CCBs are non-recourse instruments, conservatively priced at \$2 per credit, growing 5% p.a.





Perforated Bricks: Energy Efficient (for kilns and end-users)
+ Resource Efficient

Parameter	Unit	Current National Baseline	Hollow Clay Block
Specific Manufacturing Energy [A]	MJ/m ³	2350	1300
Volume of brick material per m ² [B]	m ³ /m ²	0.41	0.41
Manufacturing Energy of brick material consumed in the building per square meter[C = A x B]	MJ/m ² floor area	963.50	533.00
Floor area of the building (assumed) [D]	m ²	100	100
Total Manufacturing Energy of brick material consumed in the building [E = C x D]	MJ	96,350.0	53,300.0
Savings in manufacturing energy as compared to baseline	MJ		43,050.0

SPECIFIC MANUFACTURING ENERGY (MJ/m3)



Energy required for different processes, depending on the kiln technology (MJ/kg)



Product Density (kg/m³) depending on the type of brick manufactured

B E N E F I T S A C R O S S T H E V A L U E C H A I N

Parameter	Unit	Current National Baseline	Hollow Clay Block
Annual cooling electricity requirement per m ² floor [A]	kWh/m ² year	58.03	45.57
Savings in cooling electricity requirement per m ² floor [B]	kWh/m ² year	--	12.46
Assumed floor area [C]	m ²	100	100
Total cooling electricity requirement of the flat [D = A x C]	kWh/year	5803	4557
Savings in cooling energy as compared to the national baseline	kWh/year	--	1246
Monetary saving in bills (assuming electricity = INR 5/Kwh)	INR/year		6230

GUARANTEE FUND: QUASI-FIRST LOSS



Mandatory 2% CSR spend by real estate companies to be channelled into the Building Bricks Guarantee Fund



Guarantee Fund to be brought to use for fund investors and DFIs in the event of default by kiln owners and non-recovery thereof



Guarantee Fund

- \$50 million guarantee fund to be built over a period of 5 years, starting from year one
- Shortfall in raising the annual \$10 million contribution from Real Estate companies to be met from CCB proceeds
- Surpluses in collection to be rolled over to the next year
- Kiln loan defaults to be written off against the Guarantee Fund

Guarantee Fund Feasibility: Indian Real Estate Companies

Companies	Avg. Net Profits over last 3 years (\$ in Millions)	CSR Commitment (\$ in Millions)
DLF Ltd.	217.60	4.4
Prestige Estates Project Ltd.	56.40	1.1
NBCC India	56.93	1.1
Indiabulls Real Estate Ltd.	65.73	1.3
Bridage Enterprises Ltd.	70.27	1.4
Oberoi Realty Ltd.	108.93	2.2
Phoenix Mills Ltd.	67.20	1.3
Godrej Properties Ltd.	55.87	1.1
Omaxe Ltd.	37.33	0.7
Sunteck Realty Ltd.	25.47	0.5
Overall CSR Commitment		15.2

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