Assessment on opportunity for green construction materials in Kenya

PRELIMINARY DRAFT

Manufacturing Africa

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Our focus is on identifying the opportunity for scaling green construction materials in Kenya

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Focus of our work

Green construction seeks to reduce the carbon footprint of buildings and infrastructure through various levers. We focus in this document on green/lower carbon materials and the opportunity to manufacture them in Kenya rather than new building design approaches[1]

Greening the construction process includes:

1. **Replacing typical construction materials** with green/lower carbon substitutes
2. **Reducing construction material demand** through design and process optimization (e.g., modular housing & pre-fabrication)
3. **Reducing emission of buildings** through more efficient processes (e.g., heating & insulation, plumbing and greener electricity)

GMs can be classified as:

Green/lower carbon materials: materials with a lower carbon footprint compared to typical building materials. They replace an existing material completely. E.g.; bamboo, cross laminated timber

De-carbonized materials: existing products for which the production processes are de-carbonized, e.g., via replacing inputs with low carbon versions, processing using biofuels instead of fossil fuels, or capturing carbon emissions during their production. E.g., decarbonized steel and cement

Main objectives

- **Identify the main green construction materials** that can be scaled in Kenya
- **Determine the potential market size** of the green material sector and investment opportunity
- **Define the barriers to scaling** the priority GCMs in Kenya
- **Define the enabling initiatives** necessary to scale GCM production

1. Currently practiced in Kenya

Source: Press search; Expert interviews

The global market for green construction materials has been growing at ~13% pa since 2014

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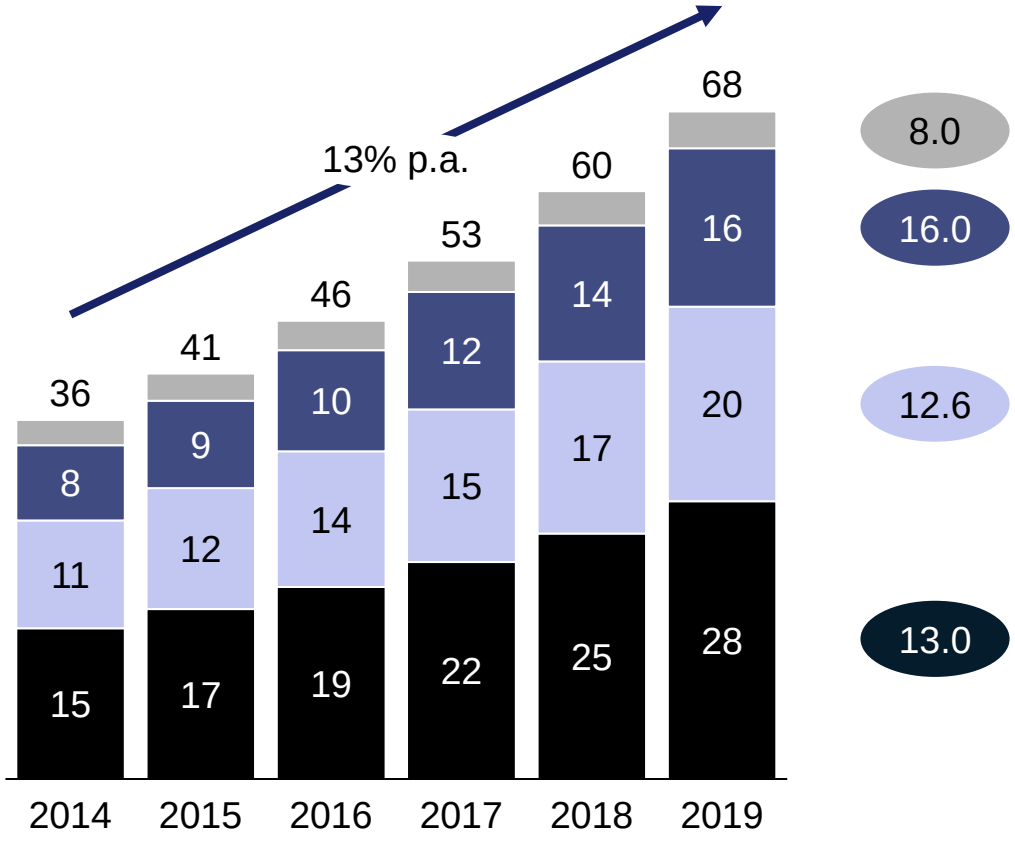
Market size and growth in green construction materials, $ Bn



CAGR % 2014-2019

8.0

16.0

12.6

13.0

Example impacts of green construction materials

Concrete and cement

- Reduce CO2 emissions, improve insulation

Steel

- Reduce CO2 emissions, reduce steel usage, improve corrosion resistance, increase recycling

Thermal insulation

- Improve heat transmission in buildings

Construction chemicals

- Reduce air losses, improve energy efficiency

Paint and lacquers

- Replace paint preservatives with green ones

Roofing

- Use durable substrates, reduce heat gains

Windows and doors

- Improve energy efficiency, reduce energy intensity (e.g., reduce aluminum content)

Flooring

- Reduce pollution, reduce emissions of VOC and other substances (e.g., glue)

Wood

- Improve longevity of wood products

Source: Global Green Building Materials 2015-2019

Major shifts have been occurring in the global construction industry towards green construction materials

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Shifts occurring	Selected approaches	Examples		
Decarbonization of materials	**Cement: Shift towards using clinker substitutes** to reduce CO2 emissions, or alternative fuels to replace fossil fuels, or carbon capture and storage	Novacem: Uses MgO clinker alternative	Zeobond: Uses geopolymer alternative to clinker	CALERA: Uses carbon capture & storage and clinker substitutes
	Steel: Shift towards decarbonization of the production process to reduce CO2 emissions, by reducing production losses, reusing scrap steel, using biomass as a fuel, using renewable electricity sources (EAF[1]), and new technologies e.g., carbon capture	CMC: Recovers metal scrap and recasts it into new products	BMW: Secured deal with H2 steel for sourcing decarbonized steel from 2025	alchemia: Modernized the furnace in its plants to reduce negative environmental impact
Use of green/lower carbon substitutes	**Use of lower carbon materials**: Shift towards using materials such as cross-laminated timber, rammed earth, low carbon brick and wood	RUBNER holzbau: Uses CLT structures as a substitute for cement	ekolution: Manufactures smart building materials – especially hemp materials	marks barfield architects: Uses timber as a carbon-storing material to form its structural walls
	Use of waste materials such as recycled plastic bricks and waste plant fibers	Gjenge: Uses recycled plastic to make bricks	Builds homes using recycled plastic	EcoDom: Builds innovative houses with materials from plastic

1. Electric arc furnace

Source: Press search

There are 30+ green construction materials in use today globally

Examples of green construction materials in use today globally

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Green construction materials can be categorized as:

- **Green/lower carbon materials:** composed of materials with a lower carbon footprint compared to typical building materials. They replace an existing materiel. E.g.; bamboo, cross laminated timber
- **De-carbonized materials:** existing products for which the production processes are de-carbonized E.g., decarbonized steel and cement

Green/low carbon materials

De-carbonized materials

1 Interior Finishes

- Natural day plaster
- Low/no-VOC (volatile organic compound) paints, stains, coatings
- Natural fiber flooring
- Paperless dry wall

2 Heating & Air Conditioning

- Solar water heating

3 Exterior siding

- Engineered wood
- Fiber concrete
- Composite

4 The framing & building structures

- Engineered wood
- Strawbale
- Insulated concrete forms (ICF)
- Structural insulated panels (SIP)
- Recycled plastic
- Earthen structures (clay, gravel)
- Building material (mix of sawdust & concrete)

5 Flooring

- Bamboo
- Cork
- Engineered wood
- Reclaimed wood
- Recycled rubber
- Carpet tiles
- Recycled plastic (carpeting)
- Precast concrete slab
- Cross laminated timber
- Decarbonized cement

6 Insulation[1]

- Fiberglass
- Cellulose
- Natural fiber (cotton, wool)
- Cork

7 Roofing

- Decarbonized steel
- Slate/stone
- Thatch
- Solar reflective tiles
- Recycled plastic
- Composite

1. Insulation is not a common construction practice in Kenyan buildings

Source: ARCHITECTURE magazine - Time Space & People; Construction Kenya

In Kenya, construction is one of the fastest growing sectors, so there is opportunity to scale green construction materials

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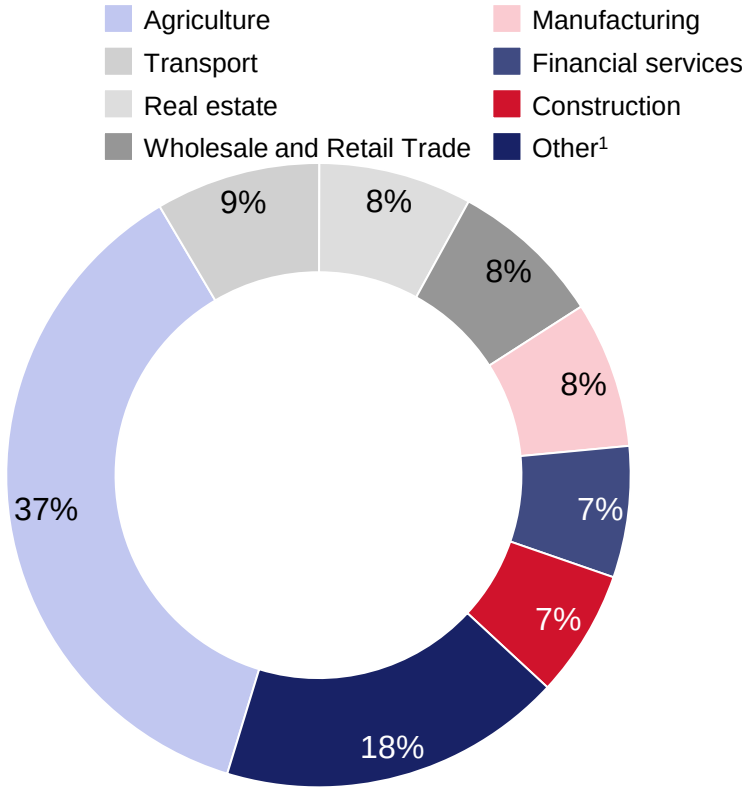
GDP contribution by sector (top 7 sectors), 2020

100% = KES 9 trillion

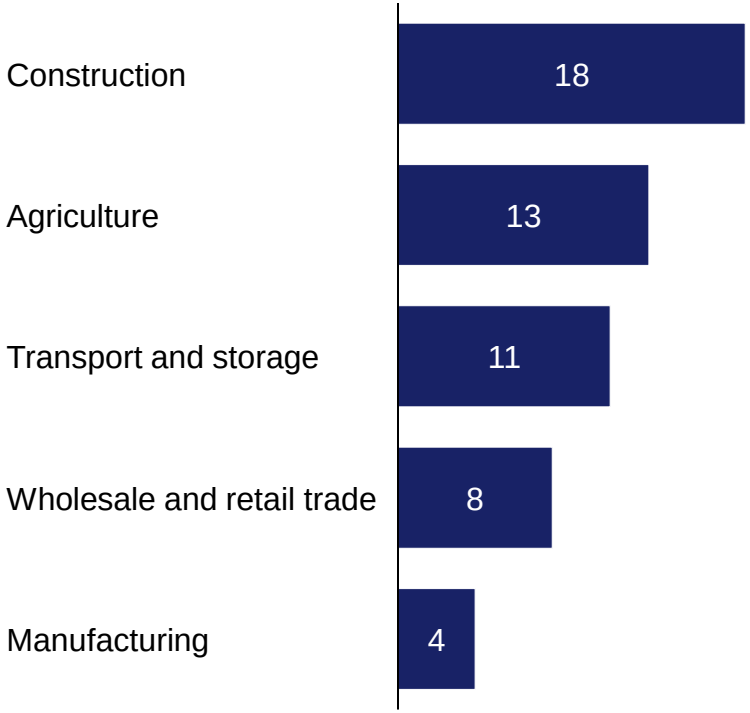
Construction is the 7th largest sector in Kenya



GDP growth,

% CAGR (2016-2020)

Construction is the fastest growing sector in Kenya



Construction was the fastest growing sector between 2016-2020 with 18% annual growth

This growth has been driven by a real estate boom specifically commercial buildings and increased spending by the Government on capital projects such as extension of the SGR[2] line from Nairobi to Naivasha and expansion of the road network across the country

The demand for construction materials is expected to continue growing significantly

1. Mining and quarrying; Electricity and water supply; Accommodation & Food Services; Information and communications etc....,
2. Standard gauge railway

Source: Kenya National Bureau of Statistics (KNBS); Kenya Association of Manufacturers (KAM); IHS Markit

We selected priority green construction materials by following a filtering process

Steps for selecting priority GCM to scale in Kenya

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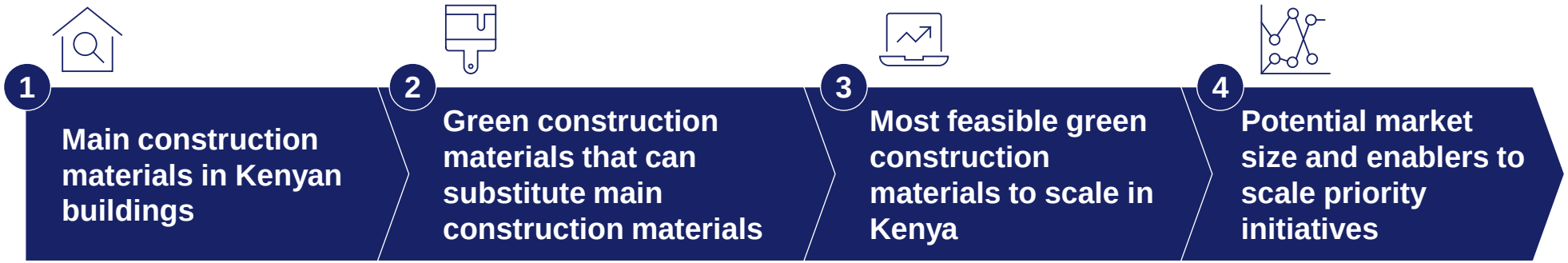

Key questions addressed

What are the main construction materials under the categories of construction end use? (based on % volume of use)

a **Which are the green construction materials** that can be used as substitutes for the most demanded construction materials?

b **Which materials could have the highest carbon reduction potential**?

Which materials have the highest potential feasibility to scale in Kenya?

Based on:

- Availability of raw materials
- Availability of technology and capabilities
- Financial impact (e.g., cost effectiveness)
- Environmental impact

a **What is the potential market size** and investment opportunities?

b **What are the barriers and enablers to scaling** each prioritized material?

c **What is the implementation plan** to deliver enabling initiatives?

Residential and commercial real estate, and infrastructure, use different types of construction materials

Construction end uses and examples of materials used in Kenya

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End use	Construction type	Materials used	
		Core materials	Finishes
Residential real estate 	Houses Apartment blocks	Concrete[1] Steel Timber Glass Gypsum Iron	Paint Ceramic tiles Plastic (cabling) Leather Insulation materials
Commercial real estate 	Retail Offices Healthcare High tech and manufacturing Logistics (e.g., warehousing) Education	Concrete[1] Steel Timber Glass Aluminium Iron	Paint Fiber concrete siding Mortaless bricks Synthetic stone veneer Exterior insulation and finishing (EIF), Dry block Aluminium composite panels (ACP)
Infrastructure 	Roads Aviation Railways Bridges Dams	Concrete[1] Steel Asphalt	N/a

1. Mixture of cement, coarse aggregate, fine aggregate, water, and chemical admixtures

Source: Expert interviews

The most demanded construction materials in Kenya are concrete, steel, and stone

% volume of materials demanded per building type

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	End use	Materials used: Concrete[1]	Steel	Wood	Stone	Iron	Other[2]
Residential real estate	Low cost housing	25	15	25	20	5	10
	Housing project[3]	25	15	10	30	10	10
	Apartment blocks	25	15	10	30	10	10
Commercial real estate	Offices	30	15	10	25	5	15
	Factories	20	30	5	5	30	10
Infra-structure	Bridges	55	35	0	0	0	10
	Roads	70	25	0	0	0	5

- **Concrete, steel and stone are the most used construction materials** across construction end uses:
  - Concrete – ~40%
  - Steel – ~20%
  - Stone – ~20%
- **Within real estate, the main materials are concrete and stone**, preferred due to durability and adaptability to sculptural treatment
- **Lower cost housing** tends to use more wood and lower quality steel
- **In infrastructure, concrete and steel account for ~95% of volumes** due to their intrinsic properties, such as strength, versatility and durability

1. Mixture of cement, coarse aggregate, fine aggregate, water, and chemical admixtures
2. Paint, plastic, ceramic tiles, wall boards and brick
3. For example, NSSF Nyayo estate

Source: Expert interviews

There are various green construction materials that can be used as substitutes in Kenyan buildings

Green construction material substitutes for major materials demanded[1]

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Detailed next in case studies

End use		Materials used: Concrete[2]	Steel	Stone	Iron
Residential real estate	**Houses**	CLT[3] Bamboo Recycled plastics Decarbonized cement	Decarbonized steel Wood Bamboo CLT	Clay bricks Compressed earth Low carbon bricks Rammed earth Recycled plastic CLT	Clay Mud Thatch Recycled plastic
	Apartment blocks				
Commercial real estate	**Offices**				
	Factories				
Infrastruc-ture	**Bridges**	Decarbonized cement	Decarbonized steel	*N/A*	*N/A*
	Roads				

Rationale

Residential and commercial real estate contain a high number of finishing materials which have higher potential to be substituted by GCM

Infrastructure uses core materials that have fewer substitutes but can be decarbonized

1.Additional green materials exist to replace other materials
2.Mixture of cement, coarse aggregate, fine aggregate, water, and chemical admixtures
3.Cross laminated timber

Source: Expert interviews

Decarbonized steel, decarbonized cement, CLT, and brick substitutes have the highest carbon reduction potential

Impact and feasibility matrix used to identify potential green materials for scaling

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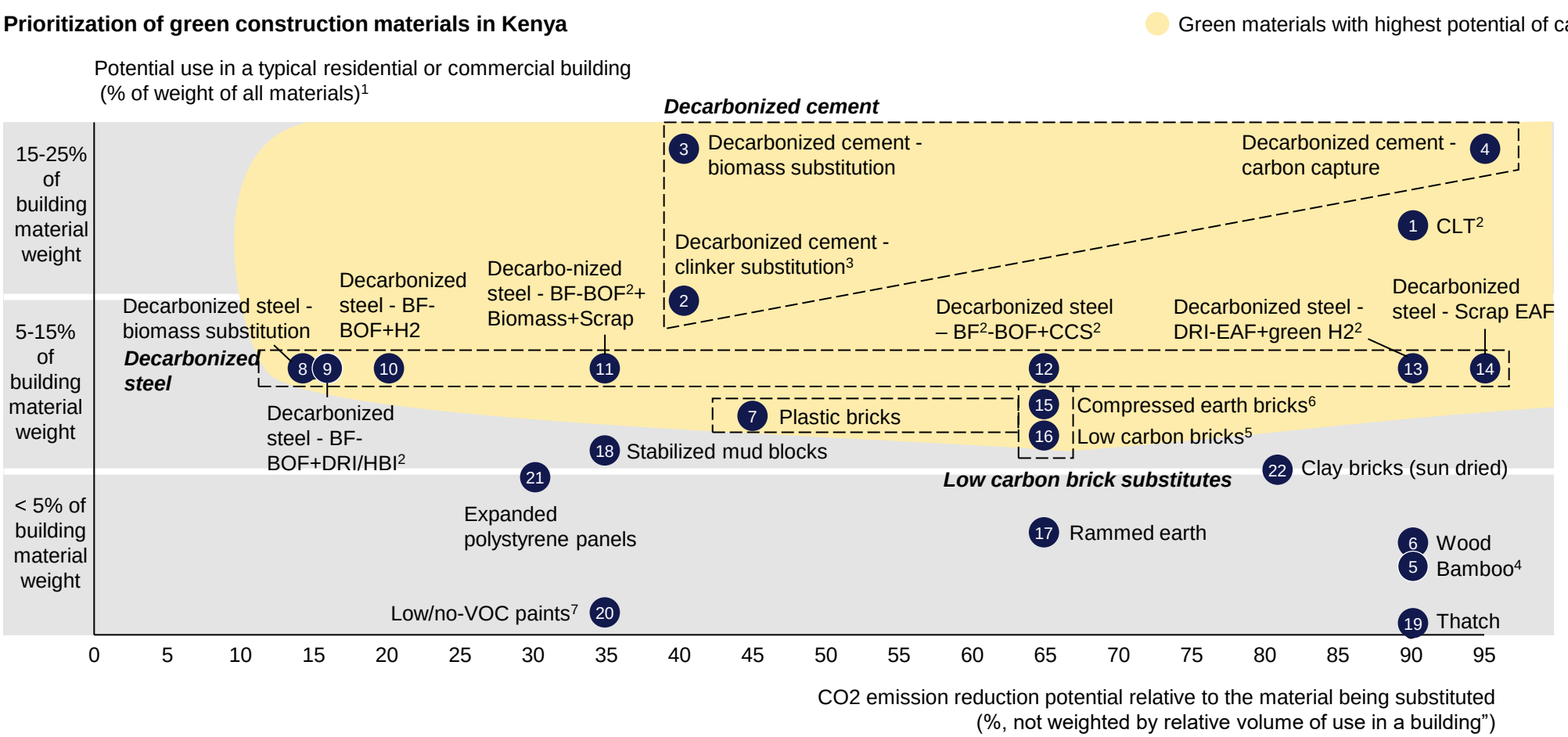
Prioritization of green construction materials in Kenya



Green and lower carbon construction materials can be measured for their carbon reduction potential based on:

- Percentage of construction materials that can be substituted
- CO2 emission reduction potential of the material compared to the material it is substituting

1. For a typical residential or commercial low-rise building; 2. Cross laminated timber, Hot briquetted iron, Basic oxygen furnace, Blast furnace; CO2 capture and storage; Electric arc furnace; Hydrogen ; 3. CO2 reduction potential is an average of the CO2 reduction potential from the common clinker substitutes including; granulated slag & fly ash ; 4. CO2 substitution is lower that CLT because of preservation and skills needed ; 5. Bricks that not require high-temperature firing, and avoid the use of high-energy materials such as portland cement ; 6. A building material made primarily from damp soil compressed at high pressure to form block ; 7. Have reduced amounts of volatile organic compounds, meaning they don't off-gas as much as traditional paints

Source: Expert interviews; Press search

For prioritized materials, we assessed feasibility and impact across 5 dimensions

Assessment criteria for scaling green construction materials in Kenya

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		Rationale
Feasibility	**Availability of raw materials**	**Establish whether Kenya has sufficient raw materials available** (e.g., available within Kenya, or available via a sustainable level of imports) **Ensure use of raw material would not result in shortage for essential industries** (e.g., food production)
	Availability of technology	**Determine whether technology would be available at scale** by 2030 **Identify whether investment required to develop the technology and capabilities** gains a return by 2030
	Availability of capabilities	**Assess if the level of awareness and proficiency of skills** required to operate technology is present in Kenya
Impact	**Financial impact**	**Estimate whether green construction material would be cost effective** compared to materials they replace
	Environmental (e.g., GHG emission reduction)	**Assess Greenhouse Gas (GHG) reduction potential**[1] relative to materials the green construction material replaces **Assess additional environmental impact measures** other than GHG emissions (e.g., impact on biodiversity, soil, water, air, and vegetation)

1. Qualitative and directional assessment of scope 1, 2 and 3 emissions

Decarbonized cement, CLT, and brick substitutes have the highest potential for scaling in Kenya

Summary of feasibility for scaling selected green construction materials in Kenya

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Low
Medium
High

Materials	Major decarbonization levers	Feasibility and impact	Rationale
Decarbonized cement	• Substitute clinker or use alternative binders (e.g., pozzolans, calcined clay, slag) • Replace fossil fuels with biomass		**High potential to scale cement produced with clinker substitution (e.g., pozzolans, slag, calcined clay):** – Kenya is already a global leader in this form of decarbonized cement in terms of volumes produced (30% of clinker is substituted and ~85% of cement sold has at least some clinker substitutes); opportunities lie in increasing the proportion of clinker substituted[2] to ~50% or with slag and gypsum to 95%, increasing volumes of cement with clinker substitutes from ~85% today to ~95%, and exploring opportunities for export – Can be achieved through acquisition of technology (vertical mills) that allows for a higher rate of substitution, and raising awareness on the potential to use pozzolanic cement instead of OPC[1] for selected infrastructure cases **Additional possibility of exploring further use of alternative fuels (e.g., biomass)** – However, requires research into sourcing alternative supply, upgrading of existing technology (gassifiers for thermochemical combustion and burners for direct combustion) and raising awareness on sources of alternative fuels for utilization
Decarbonized steel	• Maximize scrap usage and reduce production losses • Optimize use of biomass, renewable electricity and hydrogen as a reductant/ fuel • Use of carbon capture technology		**Low potential as the highest carbon-intensive processes occur outside of Kenya before inputs (e.g., billets) are imported**, (only 2 integrated steel plants in Kenya; of which one is new, so capex investments have been made and the other is small). Two possible levers for decarbonization remain: – Using scrap steel and biomass via an EAF process. However, limitations in scale due to current scrap ban in Kenya and fragmented supply of biomass creating transportation challenges respectively – Incentivizing importation of “green” steel. However, even globally, technology to scale decarbonized steel is limited, not available (e.g., backlog on DRI process technology), or not yet proven (e.g., use of hydrogen)
Cross-laminated timber	• Replace higher-carbon materials (e.g., cement, steel) with CLT (a solid wood panel made from gluing together layers of sawn lumber)		**Potential to scale in Kenya due to high carbon emissions reduction potential, and ability to import timber materials from Uganda and/or Tanzania while stimulating local demand through building pilot CLT buildings in the short-term**. Over time, will require scaling rigorous forestry management practices in Kenya, and investment in technology Potentially mitigated by the high costs of materials compared to cement or steel; however, opportunities for cost saving exist when considering labor, economies of scale, carbon credits and vertical integration
Low carbon brick substitutes	• Replace stone, concrete and fired clay bricks with low carbon brick substitutes		**Moderate potential to scale in Kenya due to high carbon reduction emissions potential across all brick substitutes, availability of technology and skills** for compressed earth blocks and plastic bricks Potentially mitigated by the fact that most brick substitutes are only suitable for low rise buildings. Compressed earth blocks are prone to breakage, plastic bricks face load bearing issues while low carbon bricks have a low tensile strength. Consumer education is necessary to shift the mindset away from bricks being low quality construction materials

1. Ordinary portland cement
2. Substituted using pozzolan, calcined clay and gypsum

The potential combined market size in 2030 for these materials ranges from USD ~0.6-1.3bn, and could create 14K to 39K jobs

Materials	Estimated incremental market size 2030 compared to 2021, $ Mn	Estimated jobs created[1], 2030 *Direct jobs*	*Indirect jobs*	Rationale
Decarbonized cement	400-600[2]	**6-8 K**	**1-2 K**	**Estimated 2030 market size assumes an increase in;** • **The proportion of total cement produced that has some clinker substitution** from 85% today to ~95% in 2030, assuming that even ordinary portland cement could use up to 15% pozzolans while retaining similar strength • **The proportion of clinker substituted by lower carbon materials** from ~30% today, to between 30-50% in 2030 by combining pozzolan, gypsum and calcined clay, or up to ~95% using slag and gypsum
Cross laminated timber	110-520	**5-24 K**	**<0.5-2 K**	**Upper bound value considers a maximum proportion of cement and steel substitutable by CLT** (10-15% of cement and 5-10% of steel demanded for real estate in 2030 could be substituted)**.** **Lower bound value takes into consideration only the consumers willing to pay a premium** to acquire CLT in exchange for faster construction (~20% of upper bound value would be taken up by consumers)
Brick substitutes	80-160	**1-2 K**	**<0.5-1 K**	**Assumes that 50-100% of standard bricks and blocks in low storey buildings could be replaced** by lower carbon/greener brick substitutes. Value is based on average number of bricks required per low storey building (30K bricks), and the estimated number of low storey buildings to be built in 2030 (60K buildings)
Total	**0.6 – 1.3bn[2]**	**12-35 K**	**2-4 K**	

1. Job estimates are based on FCDO's Development Impact Model, which is used by the Manufacturing Africa program. The model was developed by Steward Redqueen. For more information on the model, including underlying data and assumptions, see the Manufacturing Africa website (https://manufacturingafrica.org/). Estimates to the nearest 1,000 jobs, therefore numbers may not add up due to rounding.
2. This market value might go down due to the introduction of CLT as a substitute for cement

Source: Fitch Report; Interviews with manufacturers; KNBS; Mckinsey basic materials model; MACE consulting; Expert interviews; REALL

There are various actors working towards scaling the green economy in Kenya

Actors implementing initiatives for green construction materials in Kenya

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	Cement	CLT	Brick substitutes
Examples of partners	IFC International Finance Corporation WORLD BANK GROUP	GATSBY AFRICA; BUILDX	14 TREES Building better lives.; CDC
	Investing in cement projects associated with greenfield plants and capacity expansion while minimizing co2 emission footprint	**Leading a mass timber Breakthrough Initiative** to grow a consortium of partners across the timber value chain for c	**Launched a joint-venture called 14Trees** to accelerate the production and commercialization of Durabric –an environmentally-friendly, affordable brick
		Climate-KIC; WORLD RESOURCES INSTITUTE; WORLD ECONOMIC FORUM; The Nature Conservancy	MINISTRY OF TRANSPORT, INFRASTRUCTURE, HOUSING & URBAN DEVELOPMENT.
		Developed CSFEP[1] to increase the use of climate smart forest products by catalyzing market demand with seed funding from Good Energies Foundation and support from Dalberg	**The Ministry has promoted the use of Interlocking Stabilized Soil Blocks** (ISSB) technology due to its high appropriateness

Edge **IFC created EDGE**, a green building certification system for emerging markets

1. Climate Smart Forest Economy Program

Source: BuildX research; Press search; Expert interviews

There are several overarching initiatives that could move the green construction materials industry forwards

Priority enablers to scale green construction materials in Kenya

Detailed further | Decarbonized cement | Decarbonized steel | CLT | Brick substitutes

Industry stakeholder assessment on relative benefit: High | Medium | Low

HIGHLY PRELIMINARY

Category		Potential initiatives	Material	Impact	Potential stakeholders[3]
Overall initiative	1	**Develop a standard definition** for each green construction material that is recognized by the industry (e.g. based on carbon emissions reduction or adoption of certain technologies)			KGBS, KEBS
Scaling supply	2	**Set up financing incentives** to scale green construction materials meeting the standard definition, e.g., concessional debt, guarantees and grant funding			Investors and banks
	3	**Implement an inclusive forest-management approach** that could provide an opportunity to establish a sustainable wood and CLT industry and facilitate lifting of the logging ban			Kenya Forestry Services; private sector actors (e.g., Komaza)
	4	**Assess biomass availability and usability** across multiple green construction materials industrial processes (e.g. in the decarbonization of cement and steel production)			KAM
	5	**Require cement producers building new clinker plants** to follow the greenest possible processes (e.g., efficient production to reduce co2 emissions and improve clinker quality) in order to get approvals from NCA			MoITED; National Construction Authority (NCA)
	6	**Introduce import tariff adjustments** to incentivize import of green input materials in Kenya (e.g. clinker and steel billets made with lower-carbon processes)			MoITED, National Treasury
	7	**Reduce corporate tax for producers of green construction materials** (i.e., particularly CLT) who meet set standards for first years of operation (e.g., from 30% to 15% for first 5 years of operation)			MoITED, National Treasury
Scaling demand	8	**Introduce VAT exemption** on sale of CLT and brick substitutes (that meets the definition outlined above)[2]			MoITED, National Treasury
	9	**Build demand for green construction materials, by raising awareness among consumers and developers, starting with engaging 2-3 large housing developers** to pilot using a minimum percentage of green construction materials in specified projects			State Department of Housing; National Housing Cooperation; Developers (e.g., Acorn Holdings)
	10	**Consider introducing policy** that requires a certain proportion of a buildings being constructed to utilize green construction materials (e.g., with EDGE certification)			MoITED, National Treasury
	11	**Revise building codes**[1] to allow and guide on use of CLT, low carbon bricks and other green construction materials as acceptable material in the Kenyan construction industry			State Department for Housing; AAK; NCA; KGBS

1. Revised building codes have already been drafted, and are awaiting gazettement
2. VAT exemptions for specific categories of decarbonized cement could also be offered
3. Illustrative only

Source: Interviews with manufacturers, government and private sector stakeholders

Financial institutions could incentivize the production or usage of green construction materials

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Potential instruments		Examples	
Debt	Provide loans to GCM producers and green housing developers with interest linked to green KPIs / targets. Companies that achieve their green targets benefit from favorable interest rates	KCB	IFC provided USD 150mn subordinated loan to KCB in 2020 to support sustainable climate finance and scale-up lending to MSMEs KCB participates in Green Climate Fund Accreditation program
Equity	Equity investment to producers, developers or projects leveraging green materials and technology to address environment challenges		
Grants	Direct cash to support public and private actors to enable eco-friendly transformation through green materials	acorn	Issued a USD 42.5mn green bond to finance green and environmentally friendly accommodation for 5,000 university students in Nairobi
Guarantees	Credit guarantees to green housing developers and producers to mobilize funding for their projects		
Carbon credits	Facilitating the sale and purchase of carbon credits that compensate for GHG emissions emitted elsewhere	FIRSTRAND	IFC and Dutch FMO provided a USD 225mn loan to FirstRand Bank to finance SME's climate-friendly infrastructure, agriculture and manufacturing initiatives
Consumer finance	Support individual consumers to access mortgages for green housing at competitive interest rates		

What could financial institutions gain from offering these incentives?

Opportunity to improve credentials as an environmentally responsible organization

Opportunity for companies to yield a positive stock market reaction based on improvements environmental performance

Expansion of instruments portfolio by offering innovative instruments to finance green relevant projects

Potential access to government support that allows banks to channel capital to the green economy (e.g., guarantees backed by government, fiscal incentives for nascent sectors)

Source: Team analysis, Bloomberg, Climate Bond Initiative, Company information

The revised building code allows for a broader set of construction materials, but does not explicitly mention green construction materials

	Current building code (1968)	Revised building code (planned 2022)
Approved materials and technology	**The code limits the types of materials that can be used for different building purposes.** These include stone, wood, sandlime, concrete bricks and blocks, metal etc. These materials are typically either expensive or imported materials from European design standards which conform to the European context (e.g., snow loads on roofs)	**The code does not limit the types of materials can must be used, but rather specifies minimum performance required for a building, within which any material can be used.** Allows for commonly available building materials that meet the desired level of performance e.g., mangrove timber or coral stones for the costal region
	Does not provide for the use of selected common building materials including (not exhaustive): – Cross laminated timber – Precast concrete panels – Clay bricks and timber (unless tested and certified for strength by KEBS[1] and conform to British standards) – Second-hand materials (e.g., plastic bricks, construction and demolition waste)	**There are no materials explicitly banned, however there is still no mention of some newer innovative materials** such as CLT, precast concrete panels, expanded polystyrene panels, compressed earth blocks etc. This may result in challenges in getting approvals for the use of these materials.
	Measurements in imperial system	**Measurement will be in the metric system**
Enforcement measures	**Lack of clear guidance** on how to use the Code	**Comes with a handbook**, which will explain each clause
	Lack of clarity on the party responsible for the enforcement and implementation of the code, resulting in parties sometimes not adhering to the Code	**All construction works, contracts or projects either in the public or private sector shall be registered** with the Authority[2]
	Limited penalties charged for users not adhering to the provisions of the Code	**Seeking to have punitive charges** for those who do not adhere to the Code, i.e., Sh1 million or twelve-months sentence in prison

The revised building code does not explicitly provide guidance on the use of green construction materials e.g., cross-laminated timber

1. Kenya Bureau of Standards
2. The implementing authority has not yet been appointed

Source: The Local Government (adoptive by-laws) (building) Order 1968; Draft National Building Regulations 2020

Kenya can implement these initiatives in phases over the next 10 years

Kenya's strategies and policies relating to green economy

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	2022	2023-2025	2026-2030
Milestones	**A standard definition** for each green construction material that is recognized by the industry **Financing incentives** launched by 1-2 financial institutions for green construction materials producers **Revised building codes** that allow use of CLT, low carbon bricks and other green construction materials	**3-5 housing developers committed to using minimum proportion of green construction materials** in their projects **Biomass identified and in use** across 3+ further cement production plants **1-2 pilot CLT buildings** in place constructed using imported timber **New clinker plants** adhering to high quality standards and green processes	**Inclusive forest-management strategy** and sustainable timber industry in place **VAT exemption** on sale of CLT and brick substitutes **Reduced corporate tax** for producers of green construction materials (i.e., particularly CLT) **Zero-rated import duties** for green input materials in Kenya (e.g., clinker and steel billets made with lower-carbon processes) **Potential policy in place requiring certain proportion of buildings to be constructed using green construction materials** (e.g., with EDGE certification)
Activities	Set the foundations for **raising awareness of what green construction materials are** **Launch initiatives that can enable quick wins** (e.g., revising building codes) **and that may have a long lead time** (e.g., scaling forest-management) **Engage 2-3 large housing developers** to pilot using a minimum percentage of green construction materials in specified projects **Engage cement players** to ensure new planned clinker production facilities follow the greenest processes	**Start considering options for tax incentives, VAT exemptions and corporate tax reduction** to incentivize consumers and producers of green construction materials **Start to introduce rigorous forestry management practices** in Kenya, and investment in CLT production technology **Start producing CLT** at small scale, via enabling investments into technology required and importing timber	**Scale CLT production** using local timber resources via rigorous forestry management practices **Consider options for requiring developers to use a minimum proportion of green construction materials** in their buildings

1. The Big 4 Agenda in 2017 set out to build 500,000 by 2022, which equates to a rate of ~100,000 per year. This assumption has been used for 2030

Manufacturing Africa can potentially support the implementation of some of the enabling initiatives

Potential next steps for MA

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Build a coalition of CEOs to drive the agenda on green construction materials and motivate adoption of decarbonization strategies

Support multiple cement companies in developing tailored decarbonization cost curves for different initiatives and helping them define their decarbonization strategy

Enable investment facilitation for companies willing to produce decarbonized materials for more nascent materials (e.g., CLT, low carbon bricks)

Support the government to build the green industrialization path for green construction materials