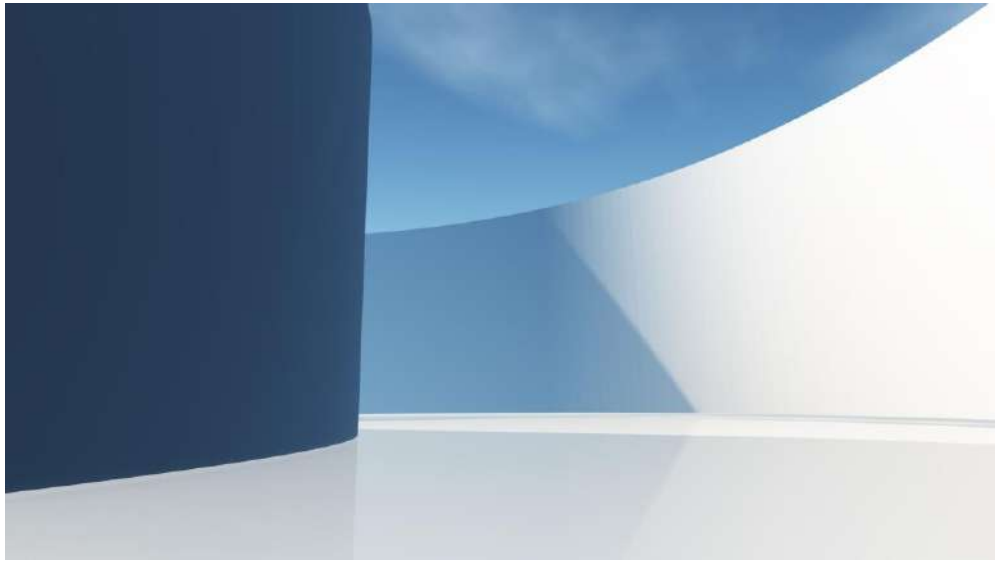
Scandinavian ESG



Affordable Housing Framework and Discovery

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"Our goal is to provide developers with a faster and more accessible way to build sustainable communities."

(Scandinavian ESG Building System).

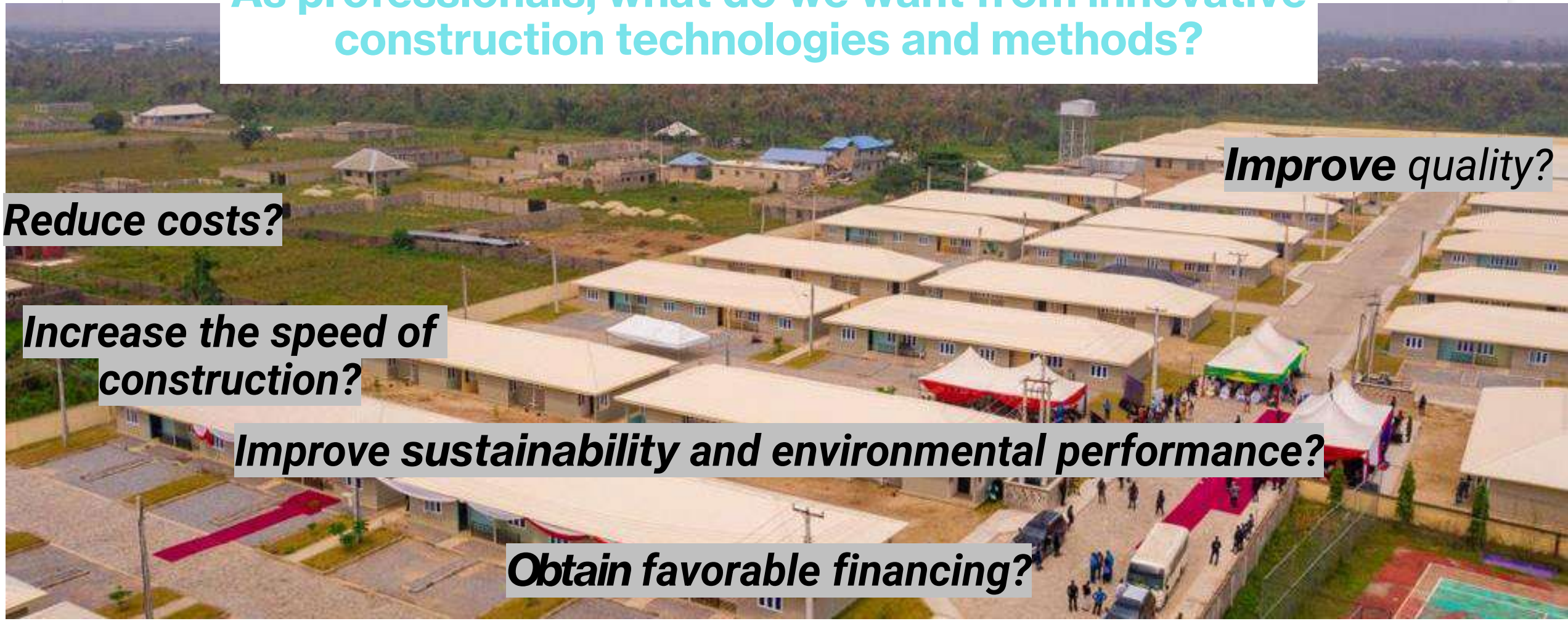
Since its inception, we have shared a goal with the World Economic Forum :


We believe that sustainable
communities transform lives

Cities around the world are growing exponentially, but such expansion comes with climate repercussions.

Innovation is needed to sustainably build the millions of homes needed around the world

As professionals, what do we want from innovative construction technologies and methods?



Start by understanding the housing value chain

Transforming the Built Environment through Sustainable Materials ”ASHRAYE” - Maharashtra

Holistic Urban Development:

- Utilizing green building practices in the construction of affordable housing and adopting World Bank’s IFC EDGE Certification standards
- Higher-quality, finished, core structures – build at speed

Climate Action and Decarbonization:

- Implement eco-friendly building practices in affordable housing projects and adopt IFC EDGE Certification standards to reduce carbon emissions

Strengthen performance on the SDG’s index:

- An internationally recognized green building certification program
- Goal: embed sustainable standards into conventional building practices

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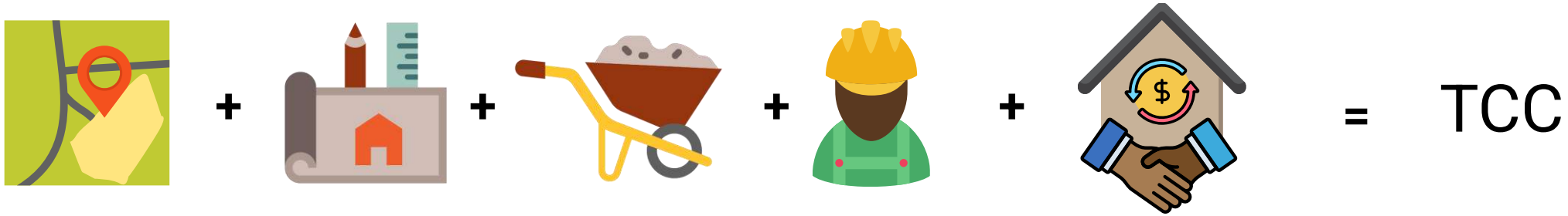
Traditional variables that establish Total Construction Costs

Land + House Design + Materials + Labor + Financing & Transaction Costs = TCC



Turbulence can affect Total Cost of project

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New green technologies can help reduce cost turbulence

Land + House Design + Materials + Labor + Financing & Transaction Costs + New Green Tech = LOWER TCC






Social Impact: Better Quality of Life

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CIMAV Research: Hot Climate Projections to 2050 and the benefit of CLC Concrete

CIMAV results show that if the conventional concrete blocks continue to be used, the air conditioning energy requirements will increase to **49% for 2030** and **61% by 2050**.

According to CIMAV, if proposed **CLC** (cellular lightweight concrete) ***could reduce energy consumption*** between **15% and 28%**, and these saving rates would remain in the future. The results indicate that it is necessary to drive the adoption of lightweight materials, so the impact of energy use on climate change can be reduced.

CIMAV (Centro de Investigación en Materiales Avanzados) Research

applied sciences

MDPI

Article

Design and Application of Cellular Concrete on a Mexican Residential Building and Its Influence on Energy Savings in Hot Climates: Projections to 2050

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Received: 2 November 2020; Accepted: 16 November 2020; Published: 20 November 2020

check for updates

Featured Application: A cellular concrete design for building walls to promote the reduction of heat transfer on the envelope and the energy-related CO_2 emissions without compromising the mechanical performance of the material.

Abstract: The thermal performance of economical housing located in hot climates remains a pending subject, especially in emerging economies. A cellular concrete mixture was designed, considering its thermophysical properties, to apply the new material into building envelopes. The proposed materials have low density and thermal conductivity to be used as a nonstructural lightweight construction element. From the design stage, a series of wall systems based on cellular concrete was proposed. Whereas in the second phase, the materials were analyzed to obtain the potential energy savings using dynamic simulations. It is foreseen that the energy consumption in buildings located in these climates will continue to increase critically due to the temperature increase associated with climate change. The temperatures predicted mean vote (PMV), electric energy consumption, and CO_2 emissions were calculated for three IPCC scenarios. These results will help to identify the impact of climate change on the energy use of the houses built under these weather conditions. The results show that if the conventional concrete blocks continue to be used, the air conditioning energy requirements will increase to 49% for 2030 and 61% by 2050. The proposed cellular concrete could reduce energy consumption between 15% and 28%, and these saving rates would remain in the future. The results indicate that it is necessary to drive the adoption of lightweight materials, so the impact of energy use on climate change can be reduced.

Keywords: cellular concrete; lightweight materials; thermal conductivity; electricity; dynamic simulation; housing; climate change

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CLC - Cellular Lightweight Concrete

Cement

+

Sand

+

Water

+

Foaming Agent
Cellular Additives

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The EchoStone Housing System

The EchoStone Housing System is composed of three main components: **Technology, Methodology**, and **Design & Planning**.

Technology is the core component.
We provide developers and contractors with the education and training needed to seamlessly adapt and integrate our high-quality technology into their projects.

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Scandinavian ESG Transformative technology utilizes:

- Onsite (in-situ) mobile concrete CLC plant.
- Lightweight and modular reusable formwork.
- CLC “next generation” concrete.
- Training and on-going support.
- Uses local materials and labor.

Machine

Enables mobile, rapid, and continuous production of CLC concrete on-site.

Formwork

Reusable up to 900 times – reducing the individual carbon footprint of each house.

Cellular Lightweight Concrete (CLC)

Accredited for strength, durability, and efficiency.

SCANDINAVIAN ESG LTD.

We bring the CLC concrete plant to you!

- Mobile CCL Plant.
- Scalable to optimize efficiencies.

Design and Planning & On-going Support

1. Design & Planning

Formwork design and planning to optimize unit designs for efficiency and sustainability

2. Mobilization

Pre-mobilization workshops that include material staging plans, formwork cycle paths, and more

3. Training

Training and onboarding of all aspects of implementing the system, including best practices for machine operation, formwork setup and cleaning, and labor operations

4. Support

Ongoing support and maintenance through the life of the project, always serving as an extension of the customer's team

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Scandinavian ESG Housing Technology Offers Many Benefits:

- Better quality and structurally more sound
- Reduced labor and material costs in the construction of the “concrete core and shell”
- Increase productivity (build high-quality, resilient, and sustainable structures in as little as 3 days)
- CLC Walls offers thermal insulation (CLC concrete is cooler vs. traditional)
- Hydrophobic - Prevents molding
- Fire-resistant and soundproofing qualities
- IFC EDGE Certified – 20% reduction (energy, water, CO^2)
- Promotes sustainable development
- Access to Green Financing
- Utilizes transformative technologies to construct quality, structurally sound, affordable green homes.
- Scandinavian ESG offers 99 years of life-cycle analysis.
- Preserves real estate assets (developers, banks, and homeowners)
- Provides homeowners with more cash flow to service debt

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This is what affordable, sustainable EchoStone housing looks like at scale

(on two continents)

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Concrete blocks losing favor

Traditional building methods, which typically involve the use of concrete blocks, are becoming increasingly expensive and inefficient. Additionally, these methods reduce quality, are less scalable and are more damaging to the environment. Modern technology and advanced machinery can help construction companies become more sustainable, efficient, and cost-effective. Projects can be completed faster and with less resources, while producing a higher quality, sustainable product.

With the EchoStone Housing System, the challenges of traditional construction can be overcome while simultaneously reducing the impact of economic turmoil. By utilizing innovative technologies and construction materials, our clients can create a complete high-quality walling system that is scalable and sustainable.

Traditional Block Construction:

Scandinavian ESG Housing System has overarching benefits beyond the core and shell works:

1) Electrical and plumbing first fixings are installed during the formwork operation, allowing the conduits and boxes to be installed prior to wall casting. In contrast, conventional block and plaster methods require the electrician and plumber to chisel the blockwork to chase the pipes, followed by extensive patching work afterward.
2) Build at Speed: Onsite concrete production with world-class formwork optimizes construction operations.
3) Build Superior: CLC Concrete create high-quality core and shell finishes that reduce material (up to 30%) and labor costs (up to 50%).
4) Build Sustainable: EchoStone's technology catalyzes sustainability performance and IFC EDGE certification through energy and carbon reduction.

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Cost Comparison Examples: ES Housing System vs Traditional Block Construction

The EchoStone Housing System embodies a deep mission: to empower developers to build high-quality, affordable, and sustainable housing for those in need. By equipping developers with the tools and knowledge to build lightweight aerated concrete (CCL) insulated homes, we are committed to decreasing the carbon footprint of both the construction process and the resulting homes.

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This is how the EchoStone Housing System looks in operation

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JCB
EchoStone

Construction Technology

Lightweight and modular formwork

- Reusable hundreds of times
- Recyclable at end-of-life
- Enables speed and quality of construction
- Uses 100% local labor

Mobile Concrete (CLC) Machine

- On demand / continuous production
- Computer and data-driven
- Minimizes waste
- Uses local materials and labor

EchoStone

Local Labor & Materials

EchoStone

Affordable Housing Framework and Discovery

Initial Questions and
How we can work together?

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Maharashtra Affordable Housing Developer Questions

- 1. What is the overall scope and objectives of the affordable housing project?
- 2. Can you provide details on the project timeline, including key milestones and completion date?
- 3. What is the targeted demographic for this affordable housing development?
- 4. Have you secured all necessary approvals and permits for the project?
- 5. What financing sources are being utilized for the development?
- 6. Are there any existing partnerships or collaborations related to the project?
- 7. What is the anticipated impact of the project on the local community?
- 8. Are there potential risks or challenges that have been identified, and how are they being addressed?
- 9. Can you provide information on the sustainability features and energy efficiency measures incorporated into the design?
- 10. What is the marketing and off-taker strategy for the affordable housing units?

ESG (Environmental, Social, and Governance) and sustainability aspects

- 1. What sustainable building practices and materials are being employed in the construction of the affordable housing units?
- 2. Is there a plan in place for energy-efficient systems, such as renewable energy sources or energy-efficient appliances?
- 3. How does the project address water conservation and waste management practices?
- 4. What measures are in place to promote social inclusivity within the affordable housing community?
- 5. Are there plans for green spaces, community gardens, or other environmentally friendly amenities?
- 6. How does the project contribute to or align with local and regional sustainability goals or initiatives?
- 7. Are there social impact assessments or plans to monitor the project's impact on the surrounding community?
- 8. What governance structures are in place to ensure ongoing adherence to ESG principles and sustainability goals?
- 9. Has the project undergone any third-party certifications related to sustainability, such as IFC EDGE Certification or other green building certifications?
- 10. How are stakeholders, including local residents, engaged in the decision-making process regarding sustainability aspects?

Affordable Housing Feasibility Study: How can we offer support?

- **1. *Executive Summary:***

- Brief overview of the proposed affordable housing project.

- Summary of key findings and recommendations.

- **2. *Introduction:***

- Background information on the need for affordable housing.

- Project objectives and scope.

- **3. *Market Analysis:***

- Demographic analysis of the target population.

- Current demand for affordable housing in the area.

- Analysis of local real estate market trends.

- **4. *Site Analysis:***

- Evaluation of potential sites for the affordable housing project.

- Consideration of infrastructure, accessibility, and zoning regulations.

- **5. *Financial Feasibility:***

- Cost estimation for land acquisition, construction, and development.

- Revenue projections, including potential rental or sales income.

- Funding sources and financial modeling.

6. *Legal and Regulatory Considerations:*

- Overview of relevant regulations and building codes.

- Land use and zoning compliance.

- Necessary permits and approvals.

7. *Technical Feasibility:*

- Assessment of the technical aspects of construction.

- Evaluation of sustainable and energy-efficient features.

- Infrastructure requirements.

8. *Risk Analysis:*

- Identification and assessment of potential risks.

- Mitigation strategies for identified risks.

9. *Social Impact Assessment:*

- Analysis of the project's impact on the local community.

- Inclusion of social amenities and community engagement strategies.

10. *Project Timeline:*

- Proposed timeline for project development.

- Key milestones and deadlines.

11. *Conclusion:*

- Summary of the overall feasibility of the affordable housing project.

- Recommendations for next steps.

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List of Pertinent Questions

Construction
Is concrete-based construction for housing is the norm?
Availability and cost of Ready Mix concrete
Access to core materials (cement, sand, water) with reliable supply chain
Updated building codes or government openness to modifications or exemptions to support innovative technologies

Sustainability/Planning/Design
Environmental Vulnerability - Climate change/natural cataclysmic events/natural disasters
Emmission Standards support EchoStone machines
EDGE presence in market

Finance
Taxes/Duties/Import Fees
Currency Stability
Import Regulations
Repatriation of Funds
Ease of doing business/regulations/VISA

Cost Comparison Examples: ES Housing System vs Traditional Block Construction

Date: October 17, 2023
Client: Adom Estate Housing
Project: Mataheko
Drawing: Proposed Residential Building (2 bedroom), drawn by Engr. Anani, March 2023
AFN Ventures Traditional estimate based on quantities from drawing and current market rates. Adom estimate based on Adom City quantities and current market rates. EchoStone estimate based on quar drawing and current market rates.

$ 11.00

		Traditional Building Method Estimate by AFN Ventures				ECHOSTONE CLC Concrete Excludes ES Fees	Cost Savings (Increase) ES Concrete vs Traditional
Item	Description	Quantity	Unit	unit Rate	Amount USD	Amount USD	% Change
A	Concrete works	10.00	m^3	136.36	1,363.64	654.55	52.0%
B	Reinforcement works	1.49	tons	1,090.91	1,628.73	1,697.41	-4.2%
C	Formworks/Labour	133.00	m^2	8.64	1,148.64	1,800.55	-56.8%
D	Blockwork / laying	284.00	m^2	12.73	3,614.55	2,389.27	33.9%
E	Plastering/patching work	516.00	m^2	3.18	1,641.82	54.55	96.7%
F	Screeding	101.00	m^2	5.45	550.91	259.09	53.0%
G	Electrical works	1.00	item	-	-	0.00	
H	Plumbing works	1.00	item	-	-	0.00	
L	EchoStone services, consumables, mobilization, training, and equipment rental					0.00	
	TOTAL ESTIMATED COST				**9,948.27**	**6,855.41**	**31.1%**

Scope of Work:
- Includes superstructure walls only.
- Excludes all substructure works (foundation and slabs).
- Includes elevated slabs and structural works for roof gutter and porch.
- Excludes electrical and plumbing works.
- Excludes window, door, roofing and all finishing works not noted.

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Cost Comparison Examples: ES Housing System vs Traditional Block Construction

Rehoboth Social Housing - The Havens

Comparing Costs: Conventional Block and Plaster Methods versus EchoStone Housing System

Evaluation based on Quad #96: Drawings titled "2-Bedroom Residential Development" dated November 2021 and drawn by David Sackey

Evaluation Date: June 9th 2023

Construction Method:	Conventional Block & Plaster (Gh¢)	Conventional Block & Plaster (USD)	EchoStone (Gh¢)	EchoStone (USD)	Variance (GHC)	Variance (USD)
Walling Material Subtotal	$ 132,741	$ 12,067	$ 93,093	$ 8,463	$ (39,648)	$ (3,604)
Walling Labour Subtotal	$ 52,238	$ 4,749	$ 25,000	$ 2,273	$ (27,238)	$ (2,476)
Walling Equipment Subtotal	$ -	$ -	$ 4,500	$ 409	$ 4,500	$ 409
Additional Utilities and Finish works	$ 9,610	$ 874	$ 900	$ 82	$ (8,710)	$ (792)
Aercell	$ -	$ -	$ 3,795	$ 345	$ 3,795	$ 345
EchoStone Fee (Royalty)	$ -	$ -	$ 66,000	$ 6,000	$ 66,000	$ 6,000
Totals	**$ 194,588**	**$ 17,690**	**$ 193,288**	**$ 17,572**	**$ (1,301)**	**$ (118)**
Rate USD to GHC	11					

Rehoboth Quad design includes 4 dwellings of 2BR/2B units of 70m2 each dwelling

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Why wait? The future is now.

GET STARTED TODAY

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We Believe Sustainable Communities Transform Lives.

We are looking for **like-minded partners** (*developers, engineers, contractors, government*) who want to **build better** (*safer, more efficient, higher-value*) sustainable communities more efficiently.

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