HYBRID EDITION

4TH GHANA GREEN BUILDING SUMMIT 2021

REPORT | 23 - 24 SEPTEMBER 2021

AN EVENT BY

YECHAM — PROPERTY CONSULT —

SUPPORTED BY

Edge — Excellence In Design For Greater Efficiencies

IFC International Finance Corporation WORLD BANK GROUP — Creating Markets, Creating Opportunities

HOSTED AT

CalBank

“

We do not inherit the earth from our ancestors we borrow it from our children

”

Native American Proverb

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Overview

On behalf of the entire organizing team at Yecham Property Consult, our amazing partners and volunteers, we wish to extend our sincerest appreciation to attendees, sponsors and other key stakeholders for making the 4th Ghana Green Building Summit 2021, an overwhelming success.

Just over a year ago, we held our first virtual summit and the thinking at the time was that we could all manage the slight inconvenience to our lives, to our routines, to our businesses and accommodate new ways of doing things. Whilst we are all grappling with the social and economic recovery from the effects of the COVID -19 Pandemic and adjusting to some semblance of normalcy, we have realized more than ever that the impact of the pandemic is not going to fade off as expected and we will have to live with it in the short future.

It is for that reason we held a hybrid event this year with a limited in-house audience, in addition to our expected online participation. Whilst a hybrid event of this kind was uncharted territory and challenging at times, the program held from September 23-24, 2021, during the World Green Building Week, was a great hit. The Summit attracted 43 speakers from 13 different countries and 691 unique session participants from 26 different countries; Australia through Bermuda to Jamaica and South Africa amongst many others.

The thinking going into this year's Summit was that, in Africa especially, we need to build back better, knowing that though Africa contributes only 7.1% of the world's greenhouse gas emissions, sub-Saharan Africa is one of the regions bearing a greater brunt from climate change impacts. One way to reduce emissions is to build resilience into our infrastructure, recognizing more than ever that, our small efforts collectively, matter in the grand scheme.

To build our capacity, we need to rethink our approach to attaining high performance buildings, our approach to energy and water efficiency, and also analyze Africa's role in the race to Net Zero Buildings. This inspired this year's theme: Re-thinking Operations Management for High Performance Buildings. We highlighted how efficient operations management of a building's life cycle can contribute immensely to increased comfort, financial savings and reduction in carbon emissions.

Some of the key takeaways included revelations that the Ministry of Works and Housing has reviewed the LI 1630 building regulations, which has been amended to align with the new building code and awaiting assent into law; that the Ghanaian Government is rolling out the 'SREP program' with projected outcomes being 15,000 Net-metering solar PV systems, 55 mini-grids and 36,500 solar home systems (SHS) to be completed by Dec 2024; that there is an ongoing urban water solutions project led by a partnership between Tema Municipality in Ghana and Aarhus Municipality in Denmark - to improve wastewater management and access to clean drinking water.

Special thank you to Hon. Francis Assenso- Boakye, the Minister of Works and Housing and his Deputy, Hon. Abdulai Abanga; Hon. Matthew Opoku-Prempeh, the Minister of Energy and his Deputy Hon. Andrew Egyapa Mercer as well as H.E. Tom Nørring, the Danish Ambassador to Ghana, who delivered the key notes and welcome address respectively. Appreciation also goes to our major partners IFC EDGE Program, the Royal Danish Embassy of Denmark, CalBank, Access Bank, Business and Financial Times, Grundfos, EY, Eco-Amet Solutions, Green Carpet 21 and Solid Green for supporting with a feature article. We intend to continue to forge strong alliances and partnerships by sustaining a virtual presence through our exciting capacity building and thought leadership platforms. Whilst we continue to advocate for sustainability in our built environment and a green transition in general, we are more than ever aware that we are as ambassadors of this change need to practice what we preach.

With this at the back of our minds, we made slight changes at this year's Summit by going paperless with an e-brochure and a set design imbedded with natural elements as much as possible. Post Summit, we are also forming action groups that will pursue specific projects with measurable outcomes. Until next time when we reconvene, let us continue to be the change that we want to see and be guided that indeed, we do not inherit the earth from our ancestors, we borrow it from our children.

Cyril Nii Ayitey Tetteh
Executive Director - Yecham Property Consult
Summit Organizer

Opening Remarks

Presented by H.E. Tom Nørring, Danish Ambassador to Ghana

H.E. Tom Nørring

H.E. Tom Nørring, made the opening remarks in which he reiterated the Embassy's commitment to collaboration across the public and private sector, citing a few projects that are supporting the green transition. Highlights of his speech are presented below.

"The Embassy of Denmark has been part of the Green Building Summit since the very beginning. This year is no exception. As many of you will know, the Government of Denmark has a very ambitious green agenda, which is a common thread in practically everything we do. In 2030, it is the aim of the Danish government to curb carbon emissions by 70% compared to 1990.

So, how do we do this? How do we go from ambition to action and impact? Well, for one we need to break it down into tangible areas where we can make a change – and this is exactly what this year's theme for Ghana Green Building Summit seeks to do. To go beyond design and into the operations of green buildings.

This year's summit will focus on areas like water, energy and green finance. We always talk about the "green agenda", and while water may be associated with the colour 'blue', it is, nonetheless, essential for the green agenda. Water is an important component in the close relationship between Ghana and Denmark, and we have a lot to share when it comes to water solutions, energy efficiency and sustainable city planning.

As an example, the Embassy is deeply engaged in a long-term collaboration with Ghana on urban water solutions led by a partnership between Tema Municipality in Ghana and Aarhus Municipality in Denmark, who work together – and as I said before including the private sector - to improve wastewater management and access to clean drinking water. Cities are important drivers in the green transition, and we are happy to see more of these joint projects where cities team up to solve some of our core challenges.

In the spirit of collaboration, I am pleased that this year we are joined at the Summit by Danish water technology company 'Grundfos' and the global engineering and consultancy company 'Ramboll'. In addition to this, the Danish Fund for Developing Countries, IFU, will contribute with insights on green finance. Grundfos is one of the world's leading water technology companies, in fact, the largest pump manufacturer in the world. But they don't call themselves a pump manufacturer – they call themselves an "SDG 6 company".

Every day Grundfos contributes to solving the world's water challenges and provides people with better quality of life here in Ghana and across the world. At the same time, Ramboll's 16.000 experts create sustainable solutions in areas such as energy efficiency in buildings, water treatment for industries and sustainable city planning, just to name a few.

Finishing up, I would like to thank you once again for the opportunity to take part in the Ghana Green Building Summit 2021 and wish you all inspiring and constructive discussions over the coming two days. We hope to see many green building projects and partnerships materialise in Ghana as a result.

Thank you!

"Water is an important component in the close relationship between Ghana and Denmark, and we have a lot to share when it comes to water solutions, energy efficiency and sustainable city planning. As an example, the Embassy is deeply engaged in a long-term collaboration with Ghana on urban water solutions led by a partnership between Tema Municipality in Ghana and Aarhus Municipality in Denmark, who work together – and as I said before including the private sector - to improve wastewater management and access to clean drinking water."

Overview in Numbers

PARTNERS, SPEAKERS AND ATTENDEES

43 SPEAKERS

13 DIFFERENT COUNTRIES

691 SESSION PARTICIPANTS

26 PARTICIPANT COUNTRIES

12 PARTNER ORGANIZATIONS

ONLINE HITS

AUG 24 - SEP 24

Site Sessions
910 ↑ 1023%

Unique Visitors
657 ↑ 943%

New vs Returning Visitors

New
628

Returning
29

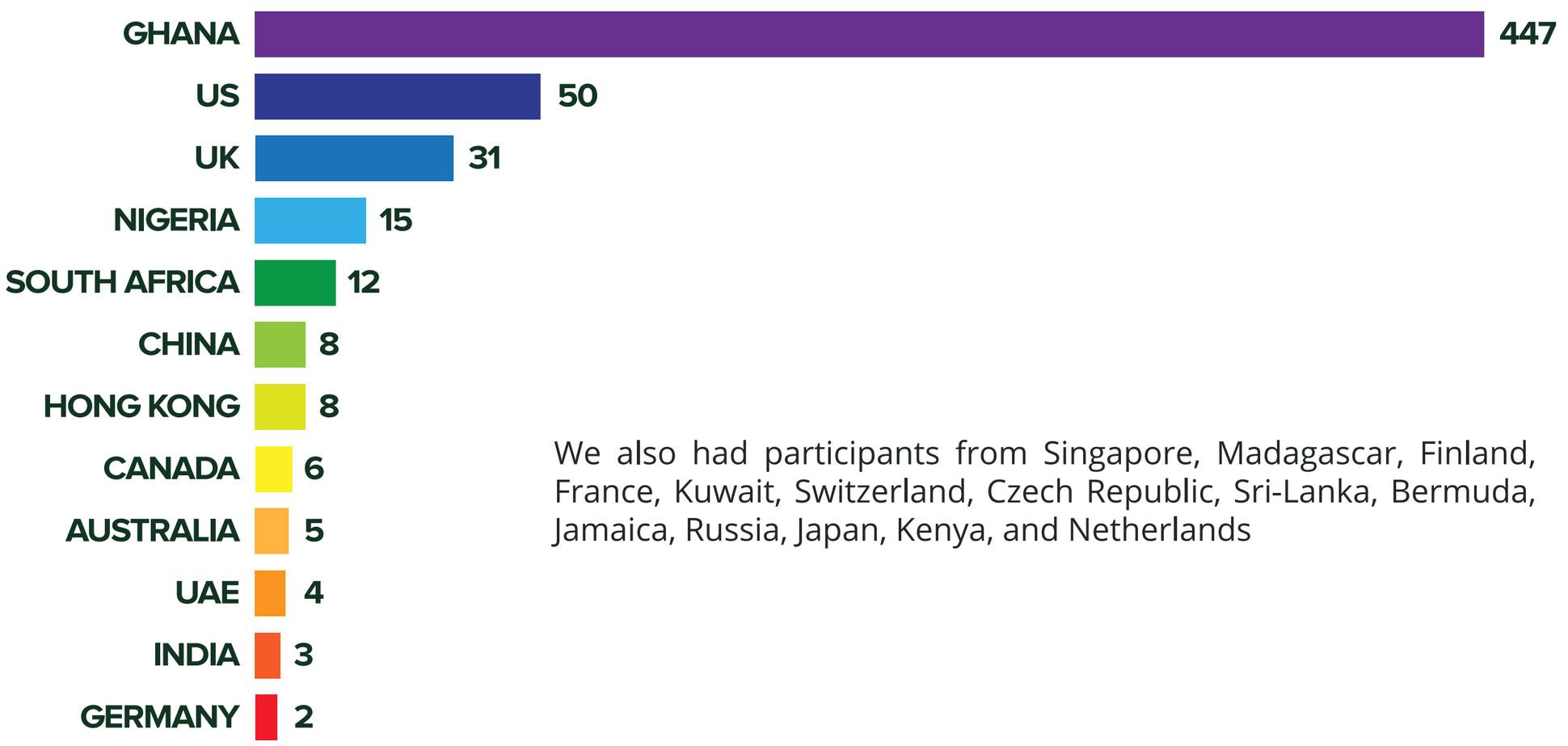
Sessions by Device

Mobile
550

Desktop
358

Tablet
2

ATTENDEES BY COUNTRY



We also had participants from Singapore, Madagascar, Finland, France, Kuwait, Switzerland, Czech Republic, Sri-Lanka, Bermuda, Jamaica, Russia, Japan, Kenya, and Netherlands

Overview in Numbers

MEDIA MILEAGE

Unique Virtual Participation — **691** DELEGATES

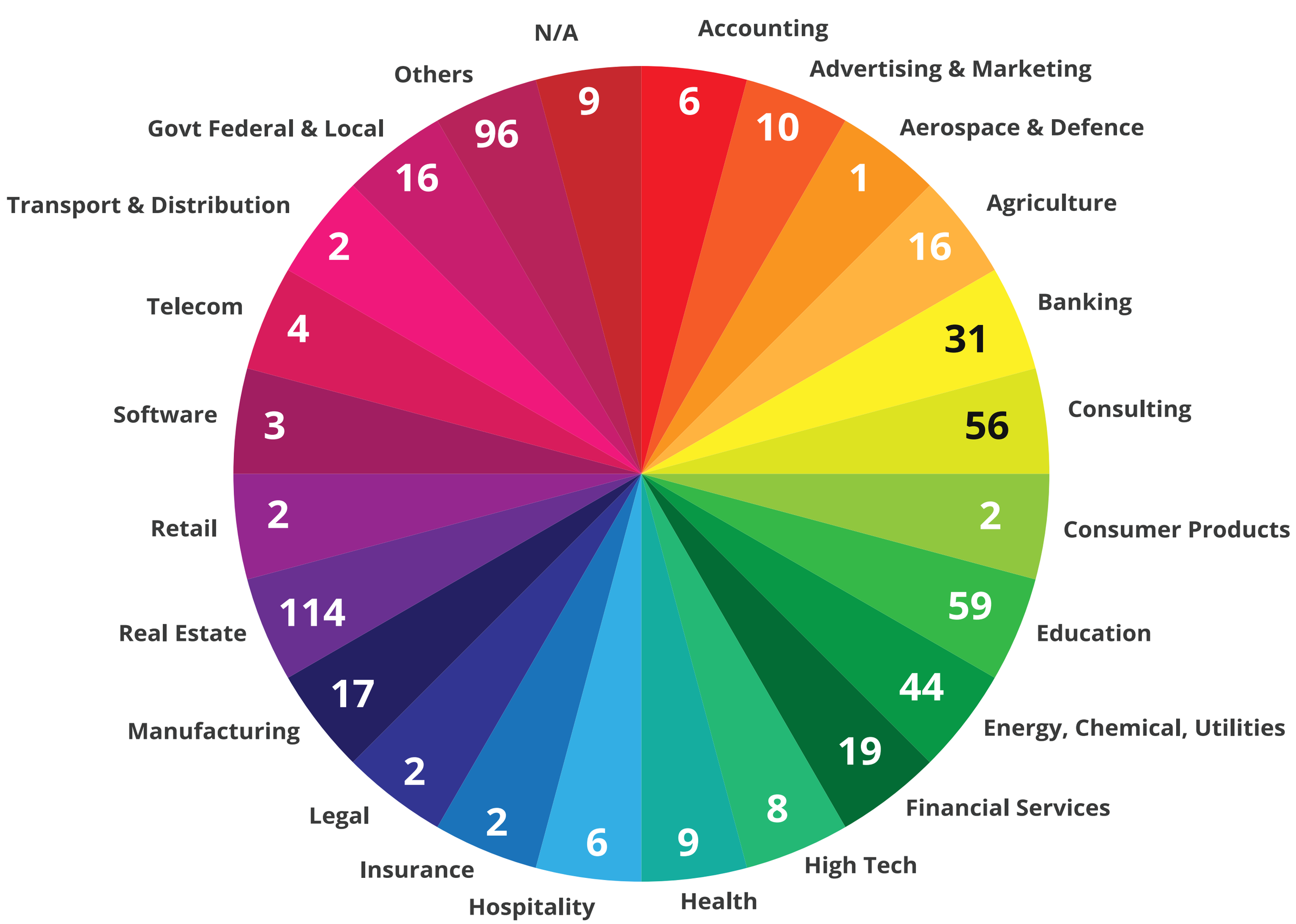
Total Email Marketing Reach — **21,400** CONTACTS

Social Media — **32,200** ONLINE IMPRESSIONS

Total Newspaper Ads (BnFT) x7 — **84,000+** TOTAL CIRCULATION/REACH

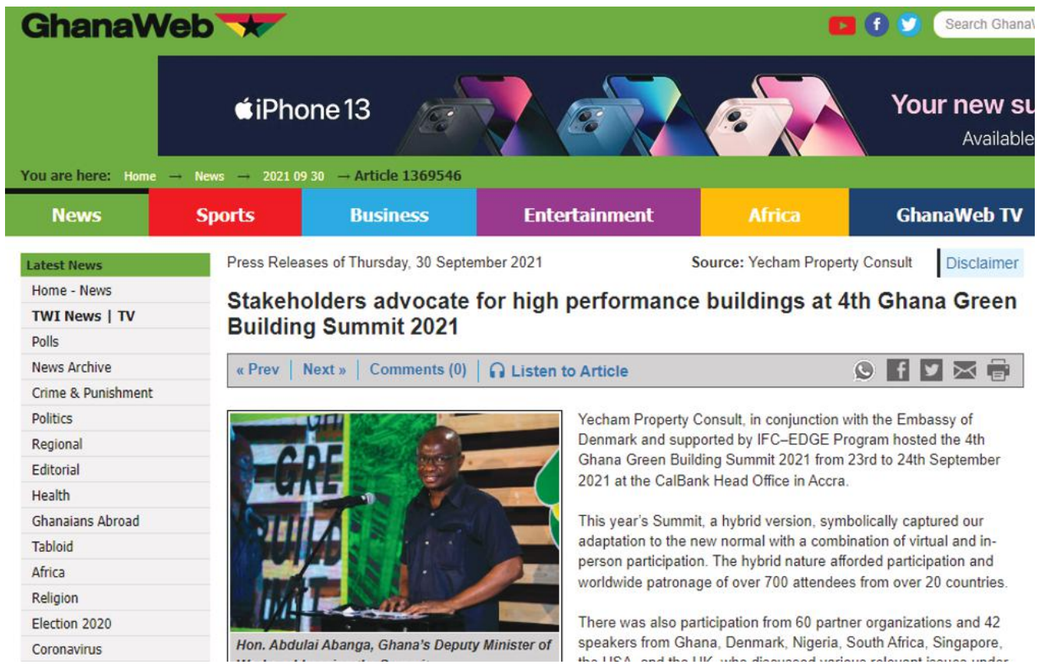
1 Virtual Workshop — **21,400+** CONTACTS (IN-HOUSE + MEQASA DATABASE)

ATTENDEES BY INDUSTRY



Overview in Numbers

MEDIA COVERAGE

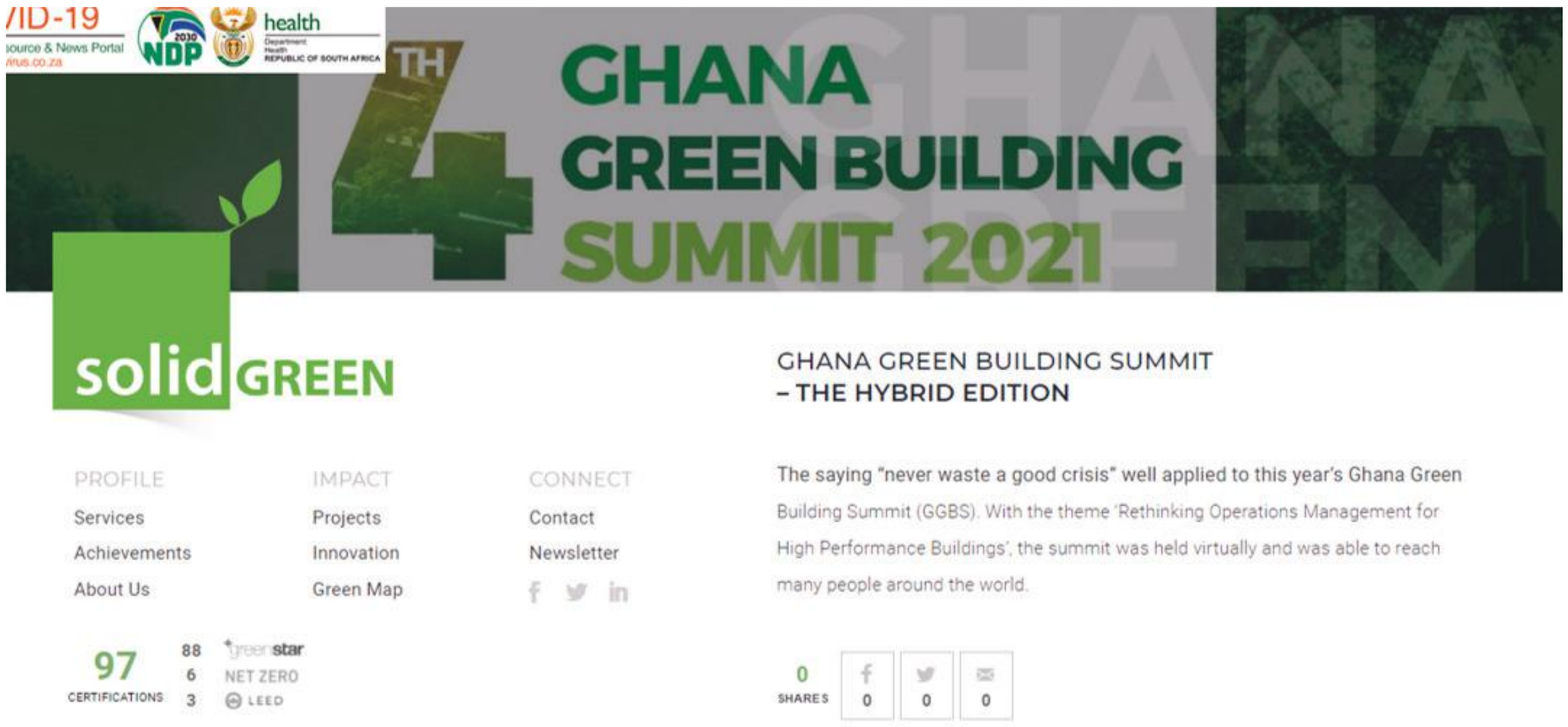


GHANA WEB

B&FT ONLINE

GTV

GTV



SOLID GREEN (SA)

Keynote Address

Delivered by Hon. Abdulai Abanga, Deputy Minister of Works and Housing on behalf of Hon. Francis Assenso-Boakye, the Minister of Works and Housing, Ghana

Hon. Abdulai Abanga

The keynote address was delivered on behalf of the Minister of Works and Housing, by the deputy Minister for Works and Housing, Hon. Abdulai Abanga, who crucially disclosed that the Ministry has initiated the processes for the review of the Building Regulations LI 1630 (1996), which when approved, will have an entire section dedicated to Green Building Regulations. **Highlights, culled from his address are presented below.**

It gives me great joy to be here this morning to deliver the keynote address for this year's Hybrid Edition of the Ghana Green Building Summit and to speak on the theme **"Re-thinking Operations Management for High Performance Buildings"**. Let me start by extending a warm welcome to our overseas guests and the many stakeholders who have joined us today through the virtual platform.

As a country, our demand for safe water and sufficient energy is increasing. This year, we have had serious concerns about the supply of potable water to our homes and the growing fear that if the prevailing trend is not reversed, we could become a water-stressed country in the coming years. As policy makers, developers and built environment practitioners, this obviously calls for the need to collectively contemplate on alternative ways by which our buildings could optimise water conservation, re-circulation and re-use towards achieving water sufficiency, particularly in our cities. Similarly, we need to embrace modern innovative technologies towards developing smarter cities that are hinged on clean and sustainable energy options such as renewable energy solutions.

From the foregoing, it is evident that we cannot overemphasise the role of a robust regulatory and institutional regime to create the enabling environment and establish the platform for good practices. As a Ministry, we have taken some bold steps towards instituting the needed regulatory framework to guide the achievement of green building solutions. Currently, the Ghana Building Code, which sets out the requirements and recommendations for efficiency standards for residential and non-residential buildings, is being used in the built environment. To effectively operationalise the Code, the Ministry has initiated the processes for the review of the Building Regulations LI 1630 (1996), which when approved, will have an entire section dedicated to Green Building Regulations.

It is instructive to note that enacting laws and formulating policies are as good as ensuring that they are implemented to achieve the intended impact for which they were enacted or formulated. As you may be aware, the governance structure within the built environment places my Ministry at the forefront in the formulation and enactment of these policies and laws, but enforcement and compliance as stipulated by the Local Government Act has remained the preserve of the Metropolitan, Municipal and District Assemblies (MMDAs) who are seldom engaged, not well-resourced or positioned to meet the challenges of enforcing the provisions in the policies and laws. To address this challenge in part while establishing an anchor institution that will better advance our quest for the development of green buildings and sustainable solutions for the built environment, my Ministry has commenced the process to establish a National Housing Authority whose mandate shall include, among other things, leading in sustainable housing development and exercising regulatory oversight over the activities of the sector. Also, their operations shall include proffering sustainable solutions to facilities management across the country.

To conclude, I wish to emphasise that, our collective responses to addressing our housing and building needs in a sustainable way will be the defining choices for our generation and future generations to come. It is therefore time to move urgently towards opportunities and solutions that will help us achieve the sustainable built environment envisaged in Ghana without harming the environment or leaving future generations to suffer the adverse implications of our actions. To realize this, we all have roles to play as stakeholders in the built environment, or perhaps, as citizens who are concerned about the sustainable development of our communities. This summit therefore present a historic opportunity for consolidating our ideas to feed into government policy.

On this note, Distinguished Ladies and Gentlemen, I wish all participants and stakeholders gathered here, very fruitful interactions and a wonderful summit.
Thank you and May God bless us all.

"From the foregoing, it is evident that we cannot overemphasise the role of a robust regulatory and institutional regime to create the enabling environment and establish the platform for good practices. As a Ministry, we have taken some bold steps towards instituting the needed regulatory framework to guide the achievement of green building solutions. Currently, the Ghana Building Code, which sets out the requirements and recommendations for efficiency standards for residential and non-residential buildings, is being used in the built environment. To effectively operationalise the Code, the Ministry has initiated the processes for the review of the Building Regulations LI 1630 (1996), which when approved, will have an entire section dedicated to Green Building Regulations."

Guest Speaker Address

Delivered by Hon. Andrew Egyapa Mercer, Deputy Minister of Energy, on behalf of the Minister of Energy, Hon. Matthew Opoku-Prempeh

Hon. Andrew Egyapa Mercer

The Minister of Energy's address was delivered on his behalf by the Hon. Andrew Egyapa Mercer, Deputy Minister of Energy, Ghana, who crucially disclosed that the Ghanaian Government is rolling out the 'SREP program' which is an investment led by the Public Private partnerships.The projected outcomes of these projects are 15,000 Net-metering solar PV systems, 55 mini-grids and 36,500 solar home systems (SHS) to be completed by Dec 2024. Highlights, culled from of his address is presented below:

I am grateful for the opportunity to deliver this address on behalf of the Honourable Minister for Energy on the topic: Efforts of the Ministry in enabling Renewable Energy and Energy Efficiency. Presently, Ghana has an installed generation capacity of more than 5,000MW with renewable in the generation mix being about 2% excluding large hydro power plants. About 85% of the population currently has access to electricity with Government frantically working at achieving 100% coverage. To this end, conversations on renewable energy are not only crucial but pressing. To scale up the contribution of renewable in the generation mix to 10% by 2030 in line with our SDG7 commitments, specific measures needed to be taken.

To promote the development of the renewable energy resources of the country, the Renewable Energy Act, 2011 (Act 832) was enacted. The said Act was amended in 2020 to amongst other things, place obligations on utilities and bulk customers to purchase part of their electricity requirements from renewable energy sources; provide for a regulatory and licensing framework for the development of renewable energy in Ghana; promote private sector participation in the RE sector and mandate fossil fuel-based wholesale electricity suppliers, fossil fuel producers and other companies that contribute to greenhouse gas emissions to complement the global effort of climate change mitigation by investing in nonutility scale renewable energy technologies.

To enable GoG meet its 10% RE target by 2030 as well as its universal electrification goal by 2024 we have developed the Scaling Up Renewable Energy Program to allow for the implementation of flagship renewable energy projects and investments that would provide models for scale-up and leverage additional private and public financial resources to the country's RE sector.

As a nation, we have taken the needed steps from the above; RE Act as amended, the Masterplan and the specific projects, to provide some level of certainty for investors. In our last mile electrification projects, we are focused on grid as well as mini/off-grid solutions. The introduction of the mini/off-grid solutions is an economic way of electrifying island and lakeside communities as well as off-grid communities. This is done whiles considering the productive use of energy.

In order to harness our energy resource endowments to achieve sustainable energy security, the following focus areas would be key to our transition to Cleaner Energy; We must harness the rich resources of clean sustainable energy such as Solar and Wind which eliminate harmful emissions and lessen the consumption of natural resources.

To this end, the Ghanaian Government is rolling out the 'SREP program' which is an investment led by the Public Private partnerships. The projected outcomes of these projects are 15,000 Net-metering solar PV systems, 55 mini-grids and 36,500 solar home systems (SHS) to be completed by Dec 2024.

The Africa Single Electricity Market (AfSEM) which was launched in June 2021 will be an essential element of the African Continental Free Trade Agreement (AfCTA). It will offer African industries, businesses and households secure, competitive and affordable electricity. At the same time, it can help improve energy security and reduce electricity prices for the consumer.

Distinguished ladies and gentlemen, Ghana will continue to drive her commitment to renewable energy in line with her commitments to her SDG7 goals. Energy is of vital importance to us not just to power our industrial agenda but also to provide our people with the many convenient benefits it brings to us all. Under President Akufo-Addo's vision for safe, secure, reliable and affordable energy for all, we will continue to pursue all the options available to us, including our renewable energy sources.

I trust that this summit will provide a useful forum to compare notes, share ideas and learn lessons on how together, we can make cleaner, sustainable energy a reality and a major part of our lives.

I thank you for your time and attention.

**"The Ghanaian Government is rolling out the 'SREP program' which is an investment led by the Public Private partnerships. The projected outcomes of these projects are 15,000 Net-metering solar PV systems, 55 mini-grids and 36,500 solar home systems (SHS) to be completed by Dec 2024.
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REEEPublic Programme

Presented by Cornelius Odai Technical Advisor, Renewable Energy and Energy Efficiency in the Public Sector (REEEPublic)

Cornelius Odai

In the past few years, GIZ has been focusing on agriculture, governance, sustainable economic development, sustainable management and waste disposal, peace and security and most important for the summit's renewable energy and energy efficiency. REEEPublic basically stands for renewable energy and energy efficiency in the public sector.

The REEEPublic project aims to support the Government of Ghana, with our biggest partners being the Ministry of Energy towards improving the energy efficiency and increasing the use of renewable energy particularly in the public sector, while contributing to the Sustainable Development Goals, objective seven, which is affordable and clean energy.

The REEEPublic project is sub divided into four main outputs. With output one, GIZ supports the amendments of the RE Act. In output two, the project is working on an energy performance certification of buildings. This project is looking at rating public buildings on the energy efficiency levels in order to promote awareness of how energy efficient public buildings are. When this project is completed, we will be rating energy efficiency in public buildings by giving them either two star, three star or four-star energy efficiency.

This will go in a long way to encourage other public buildings to become more energy efficient, because we believe that if anything is going to start with energy efficiency, it has to start from the government and the government has the most buildings when it comes to public sector. We are trying to target the public sector to make sure that they are energy efficient. With output three, we are supporting the Ghana Go Solar initiative, thus in effect, we are coming up with a Sustainable Energy Action Plan, which is going to help the government in the future to scale up all its works with regards to energy efficiency and renewable energy in Ghana.

With output four which is one of the key areas, we are having 10 demonstration projects. These demonstration projects are supposed to serve as a case study for the people of Ghana to see how they can be energy efficient. Looking through the demonstration projects, we have divided it into retrofits and new designs. We have demonstration projects, which happens to be the academy projects. This has been done in collaboration with the Korle-Bu teaching hospital, we are going to retrofit the Administration block to make it more energy efficient, this is going to help as other hospitals or medical establishments see that in as much as they use a lot of energy, they can still become energy efficient.

The demonstration projects are going to be done in phases. First, we will conduct energy audits to actually evaluate the energy efficiency of the buildings and thereafter based on these audit reports, which upon recommendations on how to make them more energy efficient, the GIZ will the finance these retrofits to ensure that these public buildings more energy efficient.

For the nearly zero energy building, this building is going to have key parameters of passive and active measures, we are looking at incorporating a lot of natural ventilation and a lot of daylighting. We are going to promote the use of natural resources heavily, because we need to make it more energy efficient and renewable energy as well. Regarding renewable energy, we know that we have to use the local materials we find available to us, instead of importing which can be harmful to our society.

People also have the misconception that when you have a building that has air conditioning, then it is not energy efficient. That isn't the case as we have energy efficient air conditions which consume relatively lower power. So, we are looking at incorporating all such technologies into the system to ensure that by the time the project is completed, you can visit it and know that everything about this building speaks energy efficiency. We will also have a solar PV on top of it, which is going to account for about 70% of the power being generated for the building.

This in a nutshell, is what the REEEPublic projects hopes to offer.

Thank you very much.

"REEEPublic basically stands for renewable energy and energy efficiency in the public sector. The REEEPublic project aims to support the Government of Ghana, with our biggest partners being the Ministry of Energy towards improving the energy efficiency and increasing the use of renewable energy particularly in the public sector, while contributing to the Sustainable Development Goals, objective seven, which is affordable and clean energy."

CalBank Green Finance Options

Presented by Cynthia Anima Mintah, Head, Corporate Banking, CalBank

Cynthia Anima Mintah

At its simplest, green finance combines the world of finance and business with environmentally friendly behavior and includes an array of loans, debt mechanisms and investments that are used to encourage the development of green projects or minimize the impact on the climate of more regular projects.

As a bank, we are happy to say that we have funding of up to USD$32.5 million to support green projects in Ghana.

The Bank has secured dedicated funding from The French Development Agency (AFD) through SUNREF (**S**ustainable **U**se of **N**atural **R**esources and **E**nergy **F**inance) a total of US$20 Million. International Finance Corporation (IFC) has also granted the Bank US$12,500,000 for the financing of renewable energy (RE) and energy efficiency (EE).

Purposes of Green Financing in Ghana

- Reduce the carbon footprint and energy intensity of the Ghanaian economy.
- Secure energy supply of household, institutions and companies in Ghana.
- Leverage investments in the fields of EE and RE to help in structuring these strategic sectors.
- Provide replicable and innovative good examples of what could be performed through local banks, households, institutions and companies to ensure scalability.

Project Eligibility

Regarding CalBank green finance products, the below product or project types are what individuals or organizations can present to be able to access green finance.

1 **Renewable Energy Projects**
   - Solar
   - Wind
   - Biogas & Biomass
   - Geothermal

2 **Energy Efficiency projects leading to 20% energy savings (MWh/y)**
   - Building retrofit
   - Replacement and modernization of industrial and agricultural machinery

3 **Environment improvement projects**

4 **Green Building Project (LEED, EDGE, BREEAM South Africa Star rating certification)**

Our Value Proposition

Loan Amount
Up to US$3 Million but can be increased to US$8 million according to project size and eligibility

Tenor
Minimum of 3 years for Energy Efficiency (EE); Minimum of 5 years for Renewable Energy (RE)

Interest Rate
At or lower than prevailing market rates

Grace Period (On Principal)
Up to 12 months moratorium

Investment Grant
Up to 10% of loan amount

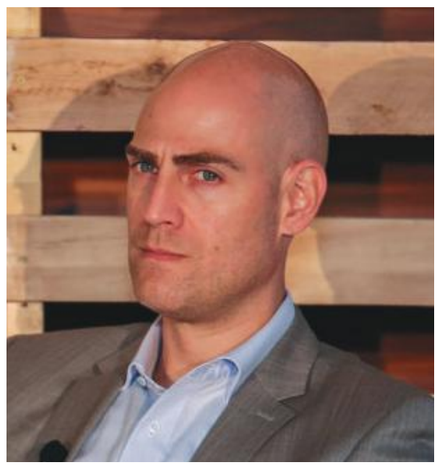
Security
Depending on the facility amount and structure, security may include but not limited to:

- Equipment Financed by the Bank
- Assignment of business proceeds to the Bank
- Any other adequate security acceptable to the Bank.

“As a bank, we are happy to say that we have funding of up to USD$32.5 million to support green projects in Ghana. The Bank has secured dedicated funding from The French Development Agency (AFD) through SUNREF (Sustainable Use of Natural Resources and Energy Finance) a total of US$20 Million International Finance Corporation (IFC) has also granted the Bank US$12,500,000 for the financing of renewable energy (RE) and energy efficiency (EE).”

Introduction to SUNREF

Presented by Normand Michaud The Team Leader, Sunref



Normand Michaud

What is SUNREF Ghana?

The Sunref (Sustainable Use of Natural Resources and Energy Finance) program is the French Development Agency's financing tools for green energy green projects. This is a tool that the French government agency has been using for years and has been implemented in more than 30 countries as of now with investments up to about $2.6 billion. This program in Ghana is the latest one and was launched officially in July 2021. The program covers the following area; to provide efficient synergy of three components: Credit line, Investment grant and Technical assistance. Then there are also the 2 other broad areas of Partnership between AFD, EU and EC and technical assistant (TA) services available at no cost to partner banks/end users

Objective

The Objective of the program is to
- Reduce the energy intensity of Ghanaian economy
- Secure energy supply for households, companies and institutions
- Leverage investments in EE and RE
- Provide replicable good examples to ensure scalability

Other elements of the SUNREF program are summarized below:

Role of the (Technical Assistant) TA provider

Support and capacity building to partner banks
Capacity building and project development support to borrowers
Marketing, promotion and awareness raising
Additional technical support

Who can benefit from SUNREF Ghana?

Ghanaian individuals and households
Private Ghanaian companies – MSME and Large
Public Ghanaian companies
Local Energy Performance Contractors. Leasing Companies – upon ad-hoc confirmation from AFD

What can be financed?

Renewable energy projects:
- Solar
- Wind
- Biogas & Biomass
- Geothermal
- Energy Efficiency projects:
- Building retrofit
- Replacement and modernization of industrial and agricultural machinery
- Environment improvement projects

Loan features	SUNREF Terms and Conditions (indicative)
Loan duration	min. 3 years for EE, min. 5 years for RE
Grace period (on principal)	up to 18 months
Maximum loan amount	up to USD 3 million from SUNREF facility
Loan pricing	at or lower than prevailing market rates
Repayment schedule	Flexible to match project`s cash flow specifics
Investment grant	Up to 10% of loan amount

"The Sunref (Sustainable Use of Natural Resources and Energy Finance) program is the French Development Agency's financing tools for green energy green projects. This is a tool that the French government agency has been using for years and has been implemented in more than 30 countries as of now with investments up to about $2.6 billion. This program in Ghana is the latest one and was launched officially in July 2021."

Grundfos Solutions for Energy and Water Efficiency

Presented by Ing. Clement Nartey Tettey, Key Account Manager, Grundfos, West Africa

Ing. Clement Nartey Tettey

Ing. Clement Nartey Tettey began his presentation by providing an interesting snapshot of the water situation worldwide, the need for efficient distribution systems to overcome the irony of water being the most abundant resource on the planet yet only 3% of it is fresh water and out of the small percentage only 1% is drinkable. The challenge clearly is not the availability of water but the treatment, efficient and equitable distribution in a manner that end users are assured of reliability and sustainability while also having less negative impact on the environment. Highlights of his presentation is presented below:

The Pump Architecture

Ahead of providing his company's pump solutions that also contribute to energy savings, Clement provided an architectural overview of water and pump systems as well as their interconnectedness at the municipal, city, regional and country level. He mentioned that within an ideal home, you would have in place the water intake, which may either be a groundwater source or a water intake from the mains; the drainage system for the building; the waste water system, as well as a booting system to enable good pressure from source to end user. This needs to be gotten right because at the end of the day, homes scale up to cities, municipalities and then countries.

Regarding commercial facilities, Ing. Clement referenced his colleague Martin's point, that in a typical building, pumps consume about 76% of the energy that is produced. "If you take a commercial facility for instance, we would have the HVAC system that is heating and ventilation system or some hot water circulation system in the building for which Grundfos provides efficient pumping solutions to enhance these systems. These solutions ensure very efficient hot water circulation system, water intake systems and some water treatment systems". Clement emphasized that Grundfos does this efficiently through what they call demand driven distribution.

Demand Driven Distribution

Ing. Clement intimated that with the concept of demand driven distribution, their aim is to ensure efficient ways of enhancing pumping systems. "We are looking at how accurately water can be delivered to our homes, our municipalities, our cities, cutting the waste in the system due to excess pressure that comes from the Water Works or in Ghana's case, the Ghana Water Company. So you know that normally for the water to get to the farthest community, Ghana Water would ensure that there is enough pressure in the system. What happens is that a lot of energy is used and wasted and this puts excessive pressure also on the mains - the water lines.

Due to this excessive pressure, we may from time to time have water leakages on the mains and sometimes it will take a bit of time or a day before the water line is fixed. With this delay, though you are losing water, the pump continues running which also leads to loss of energy. Grundfos' solution to counter such losses is built on the concept of variable speed frequency drives. Under this system, the pump is able to intelligently know the exact amount of water that is needed at various points and then the pump varies the speed of the motor to produce the precise amount of water that is needed together with the right amount of energy expended to produce that amount of water.

Through this system you lessen the pressure that is going to be on the lines at the same time, providing optimum pressure that is needed for the end users to use. Through this technology, we realized that we are able to save more on energy and cut down on the losses of water, which would have led to a loss in revenue to the state." Ing. Clement concluded.

Supporting Technology

The Grundfos SCALA2 is a fully integrated, self-priming, compact waterworks for pressure boosting in domestic applications, such as one and two-family houses and apartments. SCALA2 incorporates integrated speed control which allows maintaining a perfect pressure in the taps, meaning that the pump performance will increase with increasing demand. Other technologies like AQpure and AQtap enables an efficient system of treating and dispensing water especially in the rural communities as well as ensuring an efficient revenue mobilization.

The Grundfos AQpure water treatment system produces potable water by filtering bacteria, viruses and particles from raw source water, providing a reliable and affordable water supply even in remote areas. The water treatment is based on ultrafiltration (UF) technology. It is delivered prefabricated and prewired as plug-and play water treatment system.AQtap is an intelligent water dispenser that addresses some of the main challenges of providing a reliable and sustainable water supply in the developing world.

The AQtap can be connected to existing water network or provided as part of a total Grundfos water supply solution. Through an integrated platform for revenue collection and online management of water points, AQtap supports the financial viability and accountability of water service operations.These systems eventually ensure cutting out of waste and losses in water delivery, ensuring sustainable distribution, optimizing the very scarce resource to the benefit of all and the environment.

"If you take a commercial facility for instance, we would have the HVAC system that is heating and ventilation system or some hot water circulation system in the building for which Grundfos provides efficient pumping solutions to enhance these systems. These solutions ensure very efficient hot water circulation system, water intake systems and some water treatment systems."

Access Bank Green Finance Solutions

Presented by Philip Ampofo, Group Head, Corporate Banking, Access Bank Ghana Plc

Philip Ampofo

Introduction

Access Bank is a fully-fledged, full service commercial bank. We operate through a network of more than 600 branches, and service outlets across the globe. We span 4 continents; Africa, Asia, Europe and Middle East we promote our corporate philosophy of sustainability, and encourage our stakeholders to uphold same as bank, Every year 1% of PBT is devoted to drive sustainability. Philip Ampofo in his presentation gave an overview of the Bank's sustainability journey, their approach to sustainability, some selected green projects and funding options provided by the Bank. Highlights of his presentation is presented below:

> "We promote our corporate philosophy of sustainability and encourage our stakeholders to uphold the same philosophy as our bank. Every year 1% of PBT is devoted to drive sustainability."

Sustainable Milestones (Selected)

2008
Established CSR function.
Employee Volunteering fully adopted bank-wide

2011
Initiated Nigerian Sustainability Finance week and became the 1st financial institution to deploy a customized sustainable finance toolkit

2013
Embedded sustainability into vendor criteria

2014
Developed robust sustainability strategy themed "financing the future"
Appointed co-Chair United Nations Environment Program Finance for Africa & Middle East Force and member Global Steering Committee

2016
Joined the GRI GOLD community pioneered waste recycling in Nigeria financial sector built AFF from recyclable materials

2018
Launched Digital sustainability report Worked with 72 global banks to develop the Global principles for responsible banking

2019
Launched first ever Green Bonds certified by Climate Bonds initiative

2020
Green Bonds cross listed on the Luxembourg Green Exchange Established sustainability Champions network
First African commercial sustainability certified bank under SSCI
Launched Access Sustainability Academy.

Approach to Sustainability

The issuance of Access Bank's Green Bond (USD36.3million fixed rate senior unsecured).

Proceeds of the bond have been allocated for financing a flood defense and renewable energy projects that have long-term sustainable impacts.

It is the first-ever corporate bond in Africa to be certified by the Climate Bonds Initiative (CBI) which affirms the Bank's leading position in the African sustainable finance market

In addition to the Green bond, we have also created subsidized green loans to increase financing for environmentally-friendly projects that support decarbonization.

Access Bank Green Projects (Ghana)

- Our '**Bag a Smile Campaign**' made it possible to design bags from recycled materials for school children.
- We have automated our process across the Bank resulting in a 30% cost reduction.

- Donated hundreds of recycled school bags to pupils in deprived schools across the country.
- **Beneficiary schools:**
  - ✓ Mantse Tackie '3' KG & Primary School, Accra
  - ✓ Gbanyamni L/A Primary School, Tamale
  - ✓ Ohwimase L/A Primary School, Kumasi
  - ✓ Heve E.P & Kpetoe Basic Schools, Ho
  - ✓ Zongo L/A Primary School, Techiman
  - ✓ Methodist L/A Primary School, Takoradi

Funding Options (Selected)

	PROPOSED PROJECTS	SDG	DESCRIPTION	Funding Option
1	**Efficient Green Buildings**	Goal 11: Sustainable cities and communities	New constructions or renovation of existing buildings which meet recognized environmental standards.	GREEN BOND FUNDS
		Goal 13: Climate action	Buildings which have reduced life cycle consumption of energy levels of at least 20% less that statute/city baseline consumption levels.	Guarantees (PB, APGs etc)
2	**Sustainable Waste Management**	Goal 7 : Affordable & Clean Energy	Waste minimization, collection, management, recycling, re-use, processing, disposal products, technologies and solutions as core business	Term Loans
		Goal 11: Sustainable cities and communities		Time Loan
		Goal 13: Climate action		Overdraft
3	**Sustainable Land Use**	Goal 11: Sustainable cities and communities	Forestry with PEFC certification. Schemes for allocation and protection of environment, local community, biodiversity or equivalent.	Import Finance Facility(IFF)
4	**Clean Transportation**	Goal 13: Climate action	Low energy or emission transportation assets, systems, infrastructure, components and services	Certificate Discounting
5			Electric/Hybrid Vehicles; or transportation solutions/systems with fuel efficiency improvement of at least 20% or using non-fossil fuel and/or hybrid technologies and supporting infrastructure	Leasing

	PROPOSED PROJECTS	SDG	DESCRIPTION	FUNDING OPTION
6	**Sustainable Water Management**	Goal 6: Clean Water and Sanitation	Water collection, treatment, recycling, re-use, technologies and related infrastructure	Guarantees (PB, APGs etc)
		Goal 13: Climate action	Drip irrigation technologies, rainwater harvesting and storage in climate smart agriculture.	Term Loans
7	**Climate Change Adaptation**	Goal 11: Sustainable cities and communities	Flood defences systems and climate resilient infrastructure projects - Climate smart agriculture activities that help improve yield resilience against climate risks.	Time Loan
		Goal 13: Climate action		Overdraft
8	**Renewable Energy**	Goal 7: Affordable and clean energy	Heat and Power generation using renewable energy sources, including wind, solar, biogas, biomass	Import Finance Facility(IFF)
		Goal 13: Climate action	Manufacture or imports of components of renewable energy technology.	Certificate Discounting

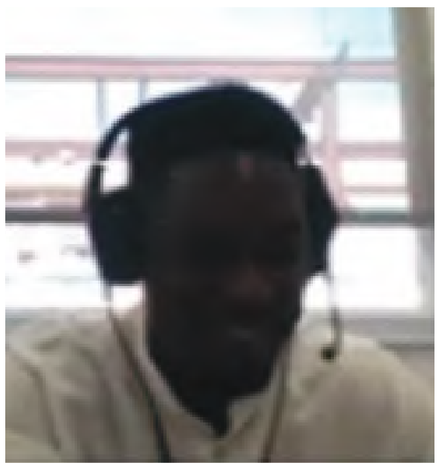
	PROPOSED PROJECTS	SDG	DESCRIPTION	Funding Option
9	**Energy Efficiency**	Goal 11: Sustainable cities and communities	Projects reducing energy waste/loss during transmission and in manufacturing & service processes by using more efficient machineries, appliances and products implementing building retrofit measures, and/or improving energy management systems, etc. that result in energy or CO2 emission reduction of 20% or more.	Guarantees (PB, APGs etc)
			Examples include Residential, commercial and industrial heating/cooling, smart grid technology and/or infrastructure as well as investments in upgrading technologies/equipment/machineries and processes that lead to energy efficiency	Term Loans
		Goal 13: Climate action		Time Loan
10	**Green Trade**	Goal 3: Good Health and Well-being	Trade finance activities that support renewable and energy efficiency product supply chains	Overdraft
		Goal 13: Climate action	Global Good Agricultural Practices	Import Finance Facility(IFF)
11	**Climate Smart Agriculture**	Goal 3: Good Health and Well-being	Projects that contribute to Climate Smart Agriculture: - Reduction of food/crop losses (e.g. warehousing, cold chain, improved packaging for highly perishable produce)	Certificate Discounting
		Goal 12: Responsible Consumption and Production	Reduction in energy use in traction (e.g. efficient tillage) and other agricultural processes .	Leasing

Sustainable Technologies

The Case of Transitioning to Africa and Emerging Markets

Presented by Jack Adjetey, Founder & MD, Reliance Fidelity International Group (RFIG) Ltd, UK & Leke Oluwole GM, Citigen District Energy Scheme, EON Energy, UK

Jack Adjetey



Leke Oluwole

To kick start their presentation Jack and Leke provided context by giving an overview into sustainable technology, which is one that creates sustainability by reducing environmental and ecological damage, one that considers natural resources and promotes economic and social development.

The example of District Energy as one of such technologies was used by the presenters to further illustrate how building performance could be optimized and improved with particular emphasis on operations and facilities management. They then reviewed a case study, a low carbon example of a live project that could be transitioned to Africa and emerging markets. Highlights of their presentation are captured in the notes below.

Regarding District Energy, Jack Adjetey mentioned it is basically a network ensuring delivery of sustainable energy to the point of use. This is done by connecting sources and resources to local requirements. In line with the Summit theme, rethinking operations management, Jack also presented a few pros and cons of district energy.

District Energy helps us to recycle otherwise wasted energy as byproducts from certain processes that we can harness to improve performance and energy supply to some of our buildings as it is very efficient in highly populated areas. With the cons, Jack indicated that though the capital expenditure can be high, it's always good to look at the benefits from a whole lifecycle perspective.

Optimizing energy for an improved building performance

Optimizing energy for an improved building performance can be done by interrogating four key elements and their relationships. The first element is the people aspect, and it looks at people, procedures and capabilities by posing a number of questions. Do we have resources who have the appropriate organizational culture aimed at optimizing energy and building performance? Do we have access to those people? Are they available or there may be a skills gap? Do they practice these procedures? Having that culture, togetherness and self-performance through others can help optimize energy for improved building performance because it's that people aspect.

The second element is performance, and this is strongly linked with practices as it looks at quality. It looks at the availability, feasibility, and viability of the technology. The issue of complexity comes into this because normally when we hear of green technologies or sustainable technologies, we think of high costs, quite complex systems. A lot of these technologies are actually based on very simple local solutions, it just has to be designed to scale and be feasible for the purpose and efficient.

Using data as a driver, one can measure the performance and be able to optimize it where necessary and also having the flexibility of your technical decisions where you should design for resilience with enough redundancy. The third element is policy, the importance of which has been reiterated by prior keynote speakers

Regional Cooperation

According to Jack, while it is great to have policies, for these to have greater impact, regional cooperation is key. "Regional cooperation doesn't necessarily have to be beyond borders, but if you look at for example like schools or universities cooperation and legal frameworks, that allows them to harness or replicate technology based on having a centralized generation point of the network can actually not only help optimize our building performance, it will help us reduce costs because we are not designing specific or from scratch for those particular users, we are just replicating it and applying it elsewhere. Jack reemphasized. The final part has to do with process, and this brings it all together because it enables people, enables performance and policies, and it results in optimization.

Citigen as a Case Study

Leke Oluwole focused on showcasing Citigen as a case study to support District Energy as a viable concept. He intimated that Citigen is located centrally within the city of London, and it is surrounded by multiple residential and commercial properties. He also provided a historical account of the site's energy journey which dates back from Victorian times to present day 2021. During that period, the site experienced changes in technology.

> "District Energy is basically a network ensuring delivery of sustainable energy to the point of use. This is done by connecting sources and resources to local requirements."

From 1894, when it used to be a coal power station for the Smithfield Market through 1995, when the largest CHP plant in the UK was installed on the site.

In 2013, EON invested 23 million pounds on this site by installing larger and more efficient CHP's, which are combined heat and power. So in essence, what this building does is it provides low carbon energy for residential and commercial properties, and it creates the energy on site and transports the energy via a network of pipe workers.

Ground Source Heat Pump

According to Leke, “In 2021, EON have invested another four million pounds in a ground source heat pump. Basically, what we are doing is we are extracting water from the London aquifer at 14 degrees and we are stepping up the temperature up to 80 degrees because some of the properties we are supplying are old and require higher heat. We call it district energy because it is technology agnostic. It doesn't really matter what's in the energy centre. It could be chillers or it could be a fuel cell, for example.

The decentralised nature of it is such that because you have the network existing, all you're doing is you're able to adapt your energy centre, control the emissions at what point and then transport that energy to your end customers. Citigen is modular, so over the years, we have access to natural gas now, and we also have access to renewable energy from the ground. This is literally groundbreaking as we are drilling 200 meters into the ground, extracting the energy and running it via heat pumps and providing heating and cooling to our customers and the network.”

Collaboration

Leke reiterated the importance of collaboration. “It's not possible to do this alone as a private company, it's not possible to do this alone. As a public entity, you need to be able to join the public and the private sectors to come in hand with the right policies and to basically allow for investors to have belief in the system and to have trust that when they invest in such technologies, they will have the policies in place that will enable it to grow”

Transiting to Africa

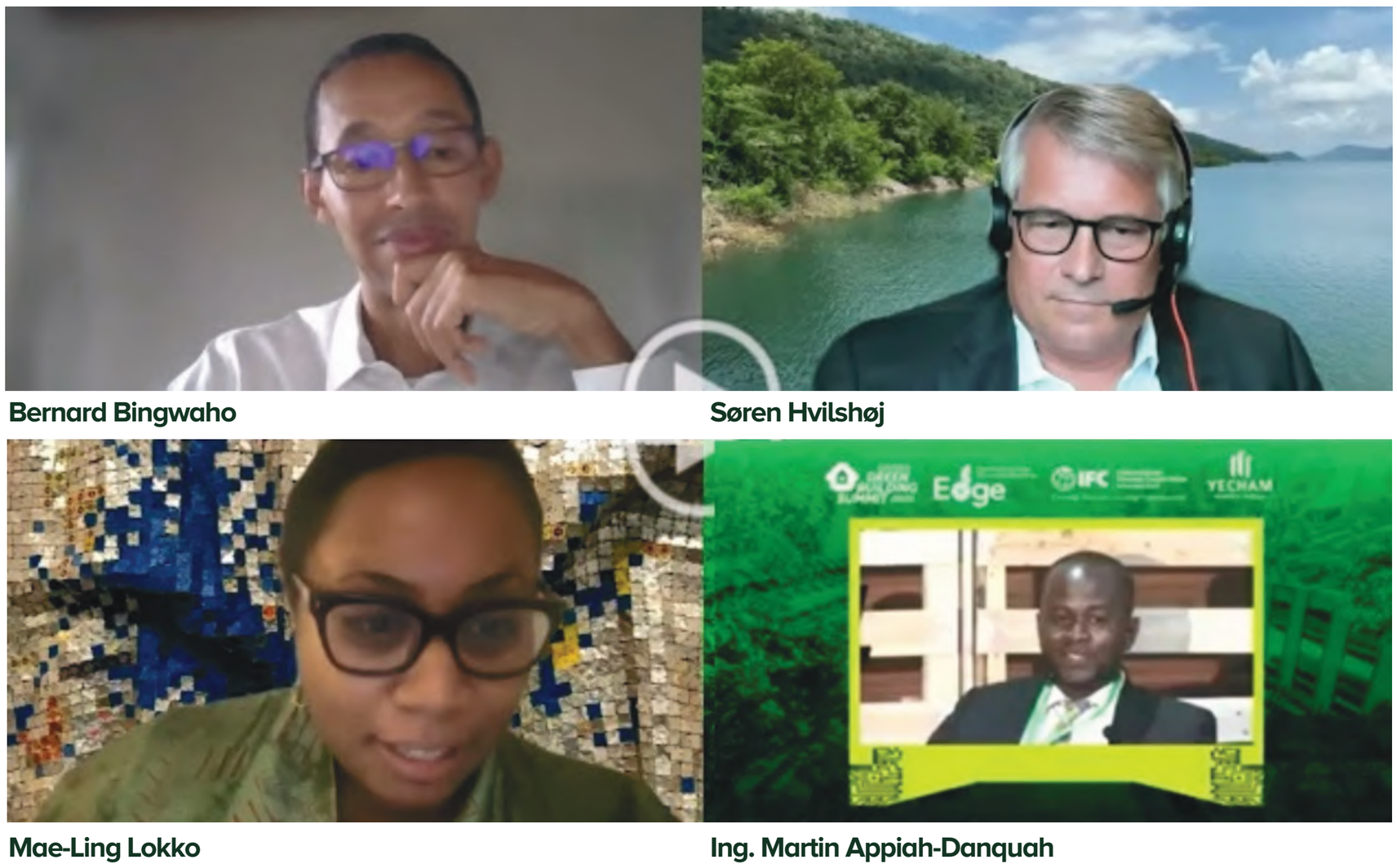
To conclude their presentation, Jack Adjetey referenced a project in Kenya to support the claim that these technologies can be smoothly transitioned to Africa. He mentioned that when driving under the Thika road, right in front of Jomo Kenyatta University, somewhere around in Nanyuki area one would notice that most of the buildings had solar heating systems all over.

This thus informed us to design a local solution for a project which required very low maintenance and sustainable systems that are not too maintenance intensive. That required a quick rethink of the design and they came up with a solar heating system that took into account the location and local energy source, enabling a design that harnessed the sun, a source readily available versus a solution that would have been more expensive if utilized in another location.

“In 2021, EON have invested another four million pounds in a ground source heat pump. Basically, what we are doing is we are extracting water from the London aquifer at 14 degrees and we are stepping up the temperature up to 80 degrees because some of the properties we are supplying are old and require higher heat. We call it district energy because it is technology agnostic. It doesn't really matter what's in the energy centre. It could be chillers or it could be a fuel cell, for example.”

Panel Discussion

Creation of Water Efficient & Energy Smart Cities



Bernard Bingwaho | Søren Hvilshøj

Mae-Ling Lokko | Ing. Martin Appiah-Danquah

THE PANEL

MAE-LING LOKKO, Assistant Professor Adjunct, Cooper Union, USA & Founder, Willow Technologies, Ghana
ING. MARTIN APPIAH-DANQUAH, Sales Manager, Commercial Building Services, Grundfos, West Africa
BERNARD BINGWAHO, Africa & Middle East Director, Tactis, France & Rwanda
SØREN HVILSHØJ, Global Division Director, Water Resources, Ramboll, Denmark

MODERATOR **KAFUI DEY**, TV Host, Moderator, Coach, Public Speaker & 2x Authour

Africa is the fastest urbanizing continent. By 2050, it will be home to more than 2.5 billion people with 55% of the population living in urban centres. This urban growth is not being accompanied by the requisite infrastructural investments or policies to cater to this growth and attendant challenges in cities. This session sought to throw light on emerging green and smart technology that ensures reliable efficient delivery, monitoring of water and energy in our homes and at the city level as well as alternative /indigenous systems and technology that can be harnessed to ensure sustainable supply and access to clean water and energy in our cities. Highlights of the session are presented below:

SESSION NOTES

Rethinking Buildings and Cities Fabric

Feeding off an earlier point made in the key note address, **Ing. Martin Appiah-Danquah** reiterated that due to increased population, there's added stress on housing and hence the need to rethink the fabric of buildings. This he believes will ensure efficient management and equitable distribution of our water and energy resources that will ultimately lead to optimum productivity in our lives.

For **Søren Hvilshøj**, it is important to re-examine water strategies to ensure even distribution across regions. In some parts there are shortages while there is too much in other parts where they have to contend with flooding issues. He called for strategic water policies that will ensure water can be harnessed where it is abundant, stored until needed, reused as many times, and importantly, used in order to improve the liveability of people in the urban area.

Setting the tone for her presentation, **Mae-ling Lokko** approached the conversation by highlighting building material life cycle and exploring how these materials, particularly those ones that are found abundantly and yet are quite underutilized given the fact that Ghana and many countries on the continent have a long history of exporting low value agriculture products and not doing a lot with the agriculture waste "There are many opportunities for that to deal with a lot of the things around the operational energy saving as well as retaining water in cities that are now dealing with a ton off climate change phenomenal, like flooding".

Bernard Binagwaho shared his believe that change management is key to driving solutions as well as collaboration between cities is key to creating smart city solutions and resilience. Such collaboration is seen in a network like ASTON which is a network of 10 African cities that work together to promote smart city solutions.

Local Water and Energy Outlook

The panel then went ahead to provide a snapshot of water and energy outlook from their various cites of abode. Martin referenced Accra where lives and noted that in Accra, once in a while, taps run dry which indeed is a challenge for the greater part of Africa. He further emphasised that though the world it is covered with 75% of water, only 3% is fresh water and even out of the 3%, only 1% is fresh water that is acceptable for drinking. The situation he reckoned will get worse do not holistically re-examine water and energy use.

Soren indicated he had observed keenly how "the world is changing all round". From his base in Denmark, he emphasised how the design of buildings is key in water management. Hear him "it will be good to bring into the design of buildings, the design of the landscape, if you do that, you will get the benefits of a greener environment, clean air, clean water. We can then see water from a holistic view rather than just getting rid of it in sewer tunnels as fast as you can, you can keep it upstream and inside the urban areas and reuse it on farms where you can treat it for ecosystems.

Mae-ling intimated that though she is based between Accra and New York, she was joining in from Scotland and noted that the landscape in Ghana is quiet similar to many countries around the world. It has a building sector that accounts up to 40% of primary energy consumption and when you break that 40% down, 20% of that energy goes into constructing buildings but the majority, 80% of it, goes into operating the building, mainly maintenance. "We need to provide thermal comfort and I think that is such a powerful theme to think about, such that building materials are integrated and not divorced from the energy agenda. Many times in Ghana we look to our mechanical systems to do all of the conditioning but if materials are wisely chosen and integrated, they can play an active role in that.

Bernard shared the practice from Kigali, Rwanda where one of the priorities is water accessibility and limiting water leaks. He emphasised that even though there is no real shortage of water, all citizens still do not have access to water in their homes. Recently the Government of Rwanda and Hungary have signed US$52 million credit line to help the Water and Sanitation Corporation Limited (WASAC) fast track the implementation of projects aimed at increasing water access in different parts of Kigali City. Secondly, regarding waste management, he observed that a lot of water in the supply network can be wasted because of issues like broken pipes etc. For him, while intelligent technologies have their place, he believes citizen engagement in helping authorities rapidly identify the leaks or any other issues regarding the cities infrastructure, is the way to go. A citizen portal is currently being deployed in Kigali that will enable citizens to report issues such as water leaks, waste dumps, broken street lamps, damaged roads or traffic lights etc. This will provide useful and important information to the city teams and enable them to be more reactive.

The Water and Energy Efficient Home of the Future

Martin shared some of his company, Grundfos' intelligent solutions that monitor and curb wastage and leaks. While Martin advocates for patronage of such intelligence systems, he also admitted that It is extremely difficult and expensive to make a building energy efficient after it has been erected. So to him, looking into the future, he recommends getting it right at the planning phase where policy makers, architects, consultants can all engage to ensure that we begin to employ some of these very intelligent solutions.

For Soren, beyond technology, the human aspect in water management system is non-negotiable. He said "if you start putting pressure on the pumps, the more pressure you have on the pumps the more leakage you have from the pipes." He proffered a few solutions. "You can have air diffusers in the showers the save 20% of the water as compared to the others. If you look at the dishwashers take the one with low water consumption and the washing machines with all this. There is so much water to be saved and by the way when you save the water we also save the energy" Soren advised.

For Bernard, no city can become resilient if the people themselves don't change the way they do things through mutual engagement. He referenced a system in Kigali that is currently being deployed - the citizen portal, where people are given the opportunity to digitally interact with authorities in delivering smart and sustainable city solutions.

Regarding the water and energy efficient home of the future, Mae-ling recommended not overly focussing on the concrete aspect of building and cities, but indoor environmental quality, including thermal, acoustic and even how the building smells for instance. "Today (in terms of our indoor air quality) we are surrounded by thousands of materials that are off gassing invisible harmful gases into our air and we are breathing that in. This leads to a ton of respiratory diseases. How might we think of the future buildings as probiotic not anti-biotic". She also recommended to look back at how vernacular buildings and technologies are able to control heat through combining the use of material, ventilation and thermal gradients for instance to mitigate drastic thermal changes in temperature from the outside to inside. It would great to employ large scale veranda spaces and well ventilated spaces for instance that will go a long way to increase our wellbeing in the building and the city.

Panel Discussion

Sustainable Materials and Fittings for High Performance Buildings

Nadia Takyiwaa Mensah

Imran Rahman

Emmanuel Stefanakis

THE PANEL **EMMANUEL STEFANAKIS**, Chief Sustainability & Product Development Officer, EchoStone Opco LLC, USA
IMRAN RAHMAN, Chief Commercial Officer, Gush, Singapore

MODERATOR **NADIA TAKYIWAA MENSAH**, CEO, Sixth Sense Manifesto

The building sector is one of the three consumption clusters – housing, transport and food – that have been identified by life cycle studies as the most important in terms of their environmental burden. Activities falling under "shelter" category specifically the building sector account for some 40% of overall energy use and associated greenhouse gas emissions and a majority of material resource use. Accordingly, the sector offers a substantial emissions reduction potential at low or no cost. On that basis, sustainable construction should be the rule and not the exception. This session sought to look at attainability of green projects built using sustainable or local materials by sharing demonstration projects or developments. Highlights of the session are presented below:

SESSION NOTES

Paradigm Shifting Technology

Emmanuel Stefanakis highlighted that when developers in emerging markets need a faster and more affordable way to build sustainable communities, EchoStone provides technology solutions to create quality homes for people who need them most. In his presentation he provided an overview of his company's technology that produces a finished house in as little as 14-day timeframe and which empowers developers with technology solutions to create high-quality, affordable, and sustainable communities. The technology is focused primarily on an advanced form of concrete called CLC. The system which is standardized to enable rapid and scalable construction employs a unique process that utilizes in-situ concrete machine, modular formwork system and foam concrete formula. This technology has been tested with model projects in Panama and in Nigeria.

Emmanuel then went ahead to share a few features about the Badagry, Lagos State project in Nigeria. He highlighted that it is the first IFC EDGE Advanced Certified project in Nigeria and only the third EDGE Advanced project in all of Africa, which resulted in about 53% energy savings, 42% water savings and 35% less embodied carbon through application of their technology and systems. Further elaborating on their technology and process, Emmanuel intimated "It's a portable in-situ concrete factory, about the size of a large SUV. It mixes cement, sand, and foaming agents to produce cellular lightweight concrete that is poured into formwork".

"It can be produced at different densities and therefore have extraordinary superior properties to traditional concrete while providing substantial strength. We apply this primarily to single and double storey structures at the moment. The cellular lightweight concrete is about half the density of traditional concrete and by injecting a foaming agent into the concrete, there are millions of air bubbles, which provide insulation, and very good comfort for individuals".

Purifying Indoor Air through Paints

Imran Rahman shared about his company, Gush's flagship product — a paint which purifies the air and removes VOCs. The product is also anti-bacterial, removes odours and reduces chances of mold build up. According to Imran, "We have innovated an all-in-one solution. From a macro perspective, we learnt that there's more relevance for us to focus on sustainable and green technologies to benefit the community. As such, the company invested heavily into R&D to develop new verticals of products along the lines of thermal solutions to make our buildings, homes, our environment, offices, hotels become more sustainable and friendly to the people who are going to stay in them."

Ascertaining Sustainability

While the market is flooded with a lot of products labelled as being sustainable, there are ways that sustainability can be properly evaluated. According to Imran Rahman one of the best ways to distinguish the sustainability of a product is by evaluating its primary, secondary, and tertiary impact. This process is a great way to evaluate products generally or to measure them against a specific sustainability goal one is looking to achieve.

Primary impact considers the sustainability of the manufacturing process. These options can limit the application of heat, excess mining of raw materials, or avoid gaseous manufacturing. Secondary impact encompasses the impact of the delivery, transportation, or importation. The reality of green building materials is that very few have access to them. Shipping green building materials around the world can create a massive carbon footprint. Tertiary impact is the point of application. To solve this, Rahman suggests looking for materials that can solve more than one solution is a great place to start. In humid climates, for example, looking for building material that is mold resistant will benefit the long-term durability of a structure and limit the consumption of other products.

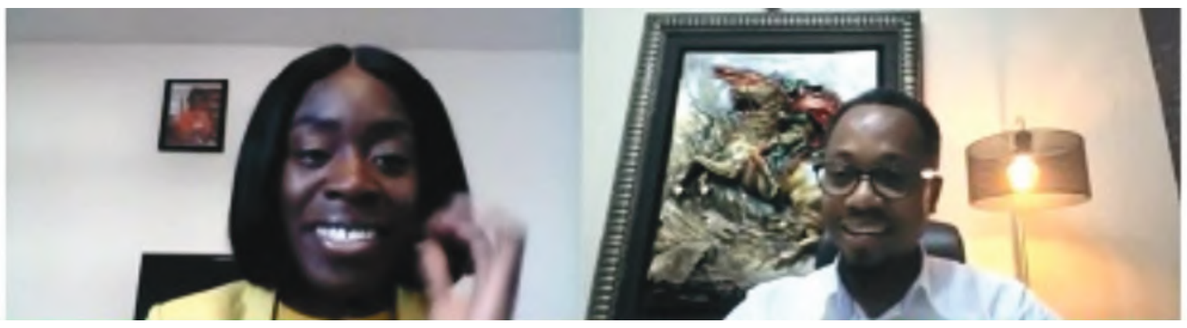
Striking the Right Balance

Imran noted that from well-known building materials like wood and bamboo, to lesser-known kelp and algae, plant-based building materials form a significant component of the green building materials market. With any nature-based solution, it's important to consider how long these natural resources take to grow before reaching maturity. With wood for example, a few questions come up, for instance, is the cost of harvesting material from the forest worth the massive impact it will have on the local ecosystem? He recommended that green building solutions should ideally capitalize on natural processes without taking anything away from our natural resources.

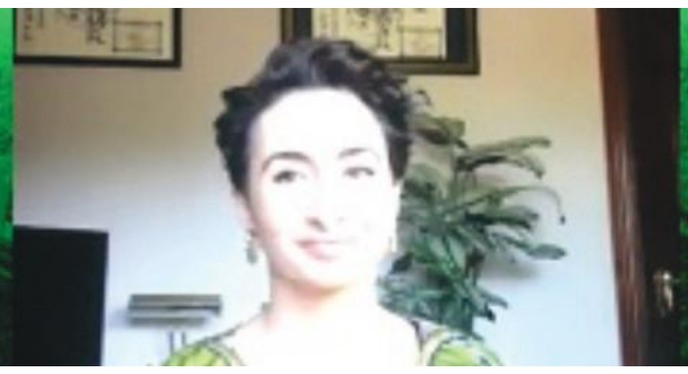
Feeding off that point, Emmanuel reiterated that it is critical to evaluate the supply chain of plant-based building materials. As a great place to start, he recommended examining of farming methods, the source of materials, and the methods used to convert raw materials into usable products. For example, while bamboo exhibits excellent qualities like rapid growth, durability, and carbon capture, it can be unaffordable as a building material in many parts of the world and the adhesives used to bind the material for commercial use in things like flooring can be harmful to humans and the environment. To build a truly sustainable product, solutions must strike a balance between environmental, social, and economic benefits.

Panel Discussion

The Art of Green living – Interior Design and Lifestyle Changes for Healthier Homes, Offices and Public Spaces



Diella Ocran Arc. William Evans Halm (A.G.I.A)



Ophelia Akiwumi Jayne Forde Grace Krobo-Edusei

THE PANEL
OPHELIA AKIWUMI, CEO, Art Deco
JAYNE FORDE, Founder, Chika & Co.
GRACE KROBO-EDUSEI, CEO, Lily Grace Interiors, Ghana
ARC. WILLIAM EVANS HALM (A.G.I.A), CEO, Specktra Gloabal

MODERATOR **DIELLA OCRAN**, Certified Health Coach, Sustainable Business Strategist & Creative Entrepreneur

There is a perception that green living is a luxury or a nice to have, thus a number of questions always come up when the subject is broached. Is it not for rich folks? Isn't it too expensive? Can you live green and luxurious at the same time; do you have to sacrifice one for the other? Is there a special style or art to living green? This session sought to share essential interior design tips that attendees could employ to provide optimum benefits in terms of health and wellness, environmental protection while making cost savings in their pocket. Highlights of the session are presented below:

SESSION NOTES

What is Green Living?

To put the conversation in context, the moderator Diella Ocran asked the panel to provide their take on what green living is. **To William Evans Halm**, green living is basically a lifestyle that allows us to have our needs met without destroying the environment. So, whether we are eating, working, playing with our kids or relaxing with family, these activities should be enjoyed without damaging the environment - a sort of a win-win situation for both people and the environment.

To Jayne Forde, green living isn't binary, whereby one is either living green or not regarding specific measures, but rather a situation where there are so many different versions of what sustainable or living green could mean to people, as well as professional interior designers. She recommended that instead of getting overwhelmed with several green solutions, it is always good to go green, one small solution at a time and once you feel like you have that one thing nailed, be it recycling or another, then you can move on the next solution.

To Ophelia Akiwumi, green living starts from the actual construction even before one actually moves to live in the house. "It starts with using the kind of materials that are sustainable that have very little effect on the environment by building primarily with non-toxic materials, local or traditional materials even before the next step of living within the interior of the house. If you are living in a concrete box, you are not going to contribute that much to environmental protection" She opined.

To Grace Krobo-Edusei, living green is really a decision. Once that decision is made, it sparks the required commitment to make green choices while working with your architect and interior designer etc. for your own improved wellness and environmental protection.

Lighting

Grace reiterated the positives of having good daylighting within the home as it goes a long way to affect our mental state, stress and general wellness. She mentioned that a great source of good lighting is the sun which has the added bonus of providing Vitamin D. Access to good lighting apart from improving one's mood also ensures 30% reduction in sleep and mood disorders, decreased daytime sleepiness, stress and even shorter hospital stays. William supported Grace's assertion by citing the example of a study that was conducted in a hospital to test for the effects of lighting on recovery.

Patients were separated into different rooms; one where they exposed to the outdoor environment and lighting, and the other group of patients into rooms with no windows. It was discovered that patients in the rooms that were exposed under outdoor environments recovered faster than the other group.

Indoor Air Quality

Grace further threw light on Indoor Air Quality. The quality of indoor air we breathe is crucial to living green and by extension staying healthy. Some paints, household cleaning items and some material finish contain Volatile Organic Compounds (VOCs). These give off harmful chemicals that compromise the quality of indoor air, making us susceptible to all forms of illness. Sources of such indoor air pollutants include but not limited to biological pollutants from bacteria, carbon monoxide from gas stoves; formaldehyde – paint, artificial wood; nitrogen dioxide (NO2) from poorly maintained appliances and water heaters.

Dangers of the prevalence of such VOCs include irritation of the eyes, nose, and throat, headaches, organ damage, allergic skin reactions, fatigue, nausea, visual disorders, impaired memory amongst others. Grace prescribed the following measures to improve indoor air quality - change AC filters, control humidity in the home, buy indoor plants to freshen the air as well as increase ventilation by opening doors and windows regularly. Regarding paints, William offered a simple solution to counter the effects of VOCs. He recommended the use of water based paints for instance, as they contain less volatile organic compounds than oil based paints.

Jayne recommended that to counter the effects of VOCs, we should do away with all of the bleachers, toxic chemicals and just go back to the old ways of using white vinegar, baking soda, liquid soap. She also asked delegates to consider using wallpapers that have little to no VOCs as well as acoustic paneling that are made out of the fiber of coconuts etc.

Water and Energy Conservation

Regarding water conservation, Jayne made a few suggestions in the area of water savings. She recommended reusing waste water from the bathroom to water plants for instance. She further suggested having plants like cactus and fauna that require minimal water consumption. She also recommended use of water timers, or sensor systems that enable minimal water use.

Adding to Jayne's recommendations on water and energy conservation, William intimated that we are already practicing this aspect of green living, an aspect that needs just a little more push. Compared to 10 years ago, when we needed about 11 liters of water to flush WCs, these days, the low flush buttons allow us to use only 30% of the water that was being used previously. He also recommended the use of rainwater harvesting, to wash cars and water lawns. "We have also made the transition from incandescent to energy saving bulbs, which has enabled a significant drop in power consumption. From the days of using 60 Watts, 80 Watts, and 100 watts, today for the same illumination, you are doing 15 Watts, 12 Watts, 6 watts. So the green transition is already in motion, the question is whether the rate of adoption is fast enough to have the desired impact on the environment."

"Sankofa" Design

Regarding design of buildings, the panel generally clamoured for a return to our indigenous house designs. Ophelia reminded the delegates "we come from a culture where we don't live on top of each other, we have the house, we have the compound, and we have everything outdoors. Now, you know we have taken everything indoors, whatever was there before, which worked, we have been busy tearing it down and putting in all these things that come from cold climates, which really does not suit our lifestyle. We are blessed with the sun and a good environment and we need to make use of that". She also urged delegates to have a mindset change about use of sustainable materials like timber and particularly raffia which she has used to build her house. She believes concerns about durability, fire, security are mindset issues as similar materials, especially timber has been used for ages in the west.

In the spirit of going back (Sankofa) William urged the audience to rethink the idea of courtyards. "Back in the 60s, a lot of houses had courtyards that allowed you to bring daylight into the house. It's amazing how everyone has switched to sliding fixed blades windows and run away from louvered windows. But there are beautiful louvered windows that allow maximum ventilation.

If you use a three based sliding window, you get 70% efficiency of the window. If you did the same three in louvered window, you get 99% ventilation." He also urged the audience to pay attention to the orientation of buildings. "Whereas in the West, you design to embrace heat, because of the cold weather, in our part of the world, we design to cut out excessive sunlight. The sun rises from the east and sets in the west, so in planning spaces, you have to consider the orientation by placing the kitchen for instance to the west since you would want the sanitizing power of the sun in your kitchens".

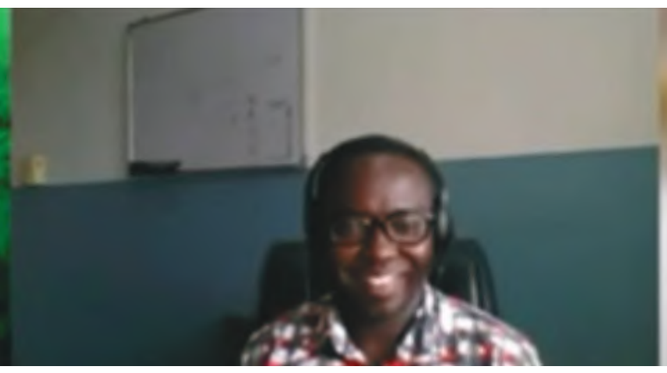
Biophilic Design

According to Jayne, this is an exciting design system based on recognizing that all of our choices, purchases, activities and decisions all have an impact on our health, our wellbeing and also the environment. It is a human centric approach and it puts the building occupants at the heart of its design, without negatively impacting the environment. It involves bringing living products into the home; use of natural and local materials as much as possible; using natural colours; introducing local vegetation and views of nature etc. She recommended bamboo flooring, rattan, stone etc. which benefits not just our health, but engages our senses, supports our wellbeing as well as reduces stress levels. She also reminded delegates that from a commercial point of view such design has been shown to positively impact organizational financial wellbeing by increasing focus and productivity.

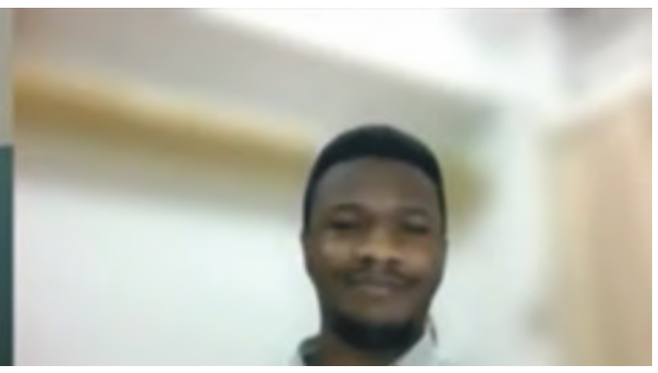
Panel Discussion

The Game Changers: Emerging Innovative Technologies Enabling Energy Efficiency & Renewable Energy

Enoch Yeboah Agyepong



Kenneth Donkor-Hyiaman



Mark Ansah

Dr. Jubril Adeojo

Dr. Nana Bortsie-Aryee

THE PANEL

DR. JUBRIL ADEOJO, Co-Founder & COO, One Watt Solar, Nigeria
DR. NANA BORTSIE-ARYEE, Global GreenTag EPD Program Manager, Australia
MARK ANSAH, Doctoral Researcher, Renewable Energy Research Group (RERG), Hong Kong
KENNETH DONKOR-HYIAMAN, Real Estate Economist, Lecturer, Development, Finance & Sustainability, KNUST

MODERATOR

ENOCH YEBOAH AGYEPONG, Sustainable Dev't Consultant, Mechanical Engineer & Director, REAG, Ghana

Resisting the shift to green energy has been shown to not only be futile but also bad business practice, given the increase in consumer demand. The need to spark this conversation to provide perspectives on disrupters and innovative technology that is driving the transition to renewable energy; the drivers of the energy transition and how state policy, regulation and the community can impact adoption of renewables at the residential, retail and commercial levels. Highlights of the session are presented below:

SESSION NOTES

Enabling Higher Adoption of Renewable Energy (RE) Technologies

The discussion kicked off with **Dr. Kenneth Donkor-Hyiaman** sharing a study he conducted on green building technology literacy and housing choice which found that there is a clear correlation between the adoption of these Renewable Energy technologies and Energy Efficiency (EE) measures and the knowledge people have about them. The findings of this study showed that green building technology literacy levels are related to future housing preferences. Dr. Donkor-Hyiaman recommended that, there needs to be a deliberate policy to encourage the education of the youth, who are the future leaders and property owners, about how green building technologies can alter their housing outcomes and preferences in favor of sustainable ones and hence contribute to achieving Sustainable Development Goal 11, which is sustainable cities and communities.

Dr. Jubril Adeojo intimated that on the continent, such green economy and climate innovation solutions, is at a nascent stage on the continent, particularly in West Africa, hence caution should be exercised not to overload prospective consumers, who may have little to no knowledge, with too much information so as not to overwhelm them into inaction. "End users consume a lot of information and may not be clear on what constitutes a green building; is it a house powered by solar? is it one where the waste water is recycled?" For effective promotion and adoption, Dr. Adeojo recommended a steady way of unpacking information, layer by layer, piece by piece supported by citing some real life examples, as generally, consumers already have a desire to live in serene and eco-friendly environments, which is always a good starting point.

For **Dr. Nana Bortsie-Aryee**, in order to encourage or spur greater adoption of RE, he reemphasized the need for the creation of unique payment systems for different people from different income groups. He acknowledged that though is a great deal of politicking, energy which is a great enabler of economic development, shouldn't be left to the government where there aren't strong frameworks to support growth of RE.

He thus encouraged the private sector to build different business models for different income groups to make RE more accessible. He cited the example of a healthy Public Private sector engagement by referencing Australia, his base, where there are programs that encourage individuals to adopt RE, especially at the residential level just as there are a number of incentives for commercial entities. At the residential level in particular, individuals can go for rebates when one adopts RE, as well as getting paid for feeding excess energy they produce back into the grid.

Emerging Innovative Technology

Regarding innovation, Dr. Adeojo reiterated that beyond the source of energy, what most consumers are concerned about is reliability and affordability in delivery, hence market players should focus on deploying technologies that ensure cost efficiency. Sharing what they have been doing at One Watt Solar, he mentioned that, essentially they are like an "Uber", whereby they raise capital to invest in the hardware technology, aggregate assets, partner with solar companies on the continent to deliver solar energy to end consumers who are thus relieved off the burden of CAPEX, operating and maintenance costs. Customers can access this on the company's lease to own products which allows consumers to buy now pay later, over 3 to 5 years.

Dr. Adeojo shared his believe that net metering and smart grid infrastructure is the future. He also envisages a continuous shift to decentralization of distribution of power for the next 10 to 50 years which has informed his company's focus for Q1 in 2022. They will be launching a new product in collaboration with utility grid, on how they can leverage on their software, built on block chain to share data, embed energy, allowing end users to effectively manage energy distribution especially for periods when there is no solar.

Mark Kyeredey Ansah also introduced the element of integrating photovoltaics (PV) which essentially are materials and devices that convert sunlight into electrical energy. He mentioned that PV can be integrated into building roofs, the building facade itself as an element of the building such that PV can come in and replace the walls, some can be transparent and some opaque depending on the applications.

Improving Energy Efficiency (EE)

Though RE contributes significantly to EE, there are other design strategies which Mark alluded to. He mentioned that for him, improving Energy Efficiency (EE) starts at the very point of building design. He reminded attendees that the residential sector takes as much as 40% of all energy consumptions patterns in Ghana. Highlighting the life cycle assessment of buildings, he mentioned that energy is most consumed at the operational stage, mainly from lighting, cooling and equipment/appliance use which all contribute to as much as 80% of the energy usage.

According to him, to be able to ensure energy efficiency or reduce energy usage, one should focus on the design of the building envelope which includes the roof, the walls, the windows and the floors as well. When the façade or the building envelope is properly designed, one is able to control heat gains into the building as well as lighting into the building.

To design a building to be energy efficient, the first approach one should start from is passive design strategies. Some of these strategies include window glazing, be it single, double or triple glazed; a highly reflective roof will mean that much of the heat entering the building will be reflected away. There are also other technologies like evaporative cooling, indirect radiant cooling, as well as shading on the windows.

Panel Discussion

Re-imagining Facility Management in a Digital Age

Yaw Barnafo

Paul Sheedy

Reginald Obeng

Kofi A.B. Asare

Obed k. Ampadu-Asiamah

THE PANEL **OBED K. AMPADU-ASIAMAH**, Head, Properties & Facilities Mgt. Fidelity Bank, Ghana
KOFI A.B. ASARE, PhD Student, College of Design Construction, Planning, University of Florida, USA
PAUL SHEEDY, Unifi.ID, Uk & China
REGINALD OBENG, Head of Property, Denton Property Managers (subsidiary of Gold Key Properties Ltd.)

MODERATOR **ENOCH YEBOAH AGYEPONG**, Sustainable Dev't Consultant, Mechanical Engineer & Director, REAG, Ghana

Efficient facility management has a direct impact on daily business operations. If problems occur within an organization's equipment or facilities, then business operations can become disrupted, which will in turn disrupt the organization's bottom line. Poorly designed or unclean workspaces, for instance, can also negatively impact the experience of customers, employees, and managers, which can have detrimental effects on productivity, the workplace experience, the brand's reputation, and more. The session sought to shift mindsets by showing clear benefits of digital integration, which should be treated as an investment with specific, measurable returns, hence a re-imagination of FM in a digital age. Highlights of the session are presented below:

SESSION NOTES

Distinction between Property & Facility Management

Obed K. Ampadu-Asiamah shared his thoughts on the key distinction between property and facility management. "In the space of property management, you will find investors who put large amounts of money into buildings with the main aim of getting a great return on investment (ROI). In order to get this ROI, landlords or investors hire professionals with the skill set to manage these properties on their behalf. These professionals, either individuals or companies, represent the landlord side of the business. The property managers then assist to market the space, set out the terms and conditions, and vet prospective tenants on behalf of the landlord. Property managers also handle lease arrangements for the landlord by ensuring the landlord's interest is protected as well as ensuring the landlord's responsibility, tenants responsibilities, and the general conditions are all clearly spelt out.

With respect to facilities management, the management skill required is different. Compared to the property manager who can come into the space sparingly over a period of time, the facility manager's job is a daily and ever present one. There needs to be the continuous management of that space in real time; running of that space to make sure the space is used as efficiently as possible. Then, there is also the management of people who come into the space at any point in time; any day of the week and within the months of the year, basically an all-year round activity. The facility manager needs to ensure that provision is made for them to feel comfortable, ensure health and safety requirements are all adhered to. The facilities manager is also responsible for other services within the space he is managing. These services cover but are not limited to power, generators, air conditioning, elevators and other hard mechanical services as well as softer services like catering, branding, entry-data and security, laundry, pest control etc.

Data Management

After the distinction was clearly made, the speakers highlighted new trends in facility management which has moved on from that caretaking or repairs and maintenance role to a more analytical one that leverages data in decision making. Obed shed further light on data management. "Knowing how to use, understand and how to apply data efficiently in order to do more with less is key to getting the best out of a robust facility management system.

Data has to be broken down into matrices, like performance indicators and things that you'll be able to measure. Take energy for instance, you have to break them into unit costs per square meter for example and once you get your data and you have all these metrics in place, then benchmarking comes in. You can only control what you measure hence benchmarking plays a crucial role and every facility manager should focus on benchmarking, using previous years' numbers, to be able to see upwards and downwards trends or even when trending flat. It is only when the facility manager employs the above that he will have opportunities to be able to improve efficiency, reduce wastage etc."

Supporting Obed's assertions, **Kofi A. B. Asare** mentioned that in essence, what accurate data affords, is for the opportunity to be predictive and preventative as well as offer the opportunity to plan better based on needs assessment. Kofi highlighted a study that was done on about 200,000 work orders that showed that for every 98 corrective maintenance activities, there were only two preventive maintenance activities. "Now that's a very stark statistic. It tells you that people only fix it when it's broken. With data, you get a lot more insight, you get to know if you are being predictive and preventive. So let's say you were spending a hundred minutes on repairing every broken down asset, with data, you are going to reduce that work order time now to about 91.3 minutes That means you are saving on money as well, because we are paying by the hour, you are saving 8.7% on that money you are to pay. On the average, if you've got facilities recording about 10,000 work orders every year, that's good money you are saving. So that's where the business case lies when it comes to using data to drive decision-making in facility management"

The Role of Building Information Management (BIM)

Building information modeling involves three things; policies, processes, and technologies. Together they make up a methodology that helps us to manage building and project data.

To illustrate this model, **Kofi A. B. Asare** made a presentation in which he cited a few practical examples to explain the role of BIM. Referencing a building on site, he cited the following instances: If we needed to find some information on the escalator, we don't need to go through banker boxes anymore. Everything is attached to the piece of equipment in here and this also helps with space utilization and we've got every information we need on that particular asset. If we want the product documentation, we go straight to the asset and it opens up on a mobile device, which you can take around when you are doing your work orders.

He also mentioned that attaching real time technologies like IOT sensors and artificial intelligence, these help us to analyze the data that is provided by these systems. He simulated one of such real life situations by referencing a basic work order management system or computerized maintenance management system, to which work orders can be sent out to. While admittedly, we cannot have access to all of the critical elements in 3D, a manager can go with the scans, the barcode, or the QR code. This manager then gets an augmented reality image, and he's able to report on repairs that they have done or things that they have been installed in real time and this goes back into that system. Kofi in acknowledging the amazing enabler that technology is, cautioned not to be too fixated on the tool itself. "Technology is only a tool, not a solution, but the processes and people are the most important" He concluded.

Regulatory Requirements

Yaw Barnafo, the moderator set the tone by asking, "how do we leverage all of this technology to make that process also better? Things are changing around the world in terms of control also, and people want to know, they ask a lot more questions, how many people have been in this building in the last one month? They want to know and the facility manager cannot just say, oh, I'll go and pull up a box and you check you. Somebody needs to have that information somewhere. How do we interface with the regulators in all of this? ".

Reginald Obeng shared a few tips in that regard. He said "In the facilities management space now, for you to be able to work, you first need your registration documents. So of course the registration comes in play where you fall under a separate category, and that gives you the license to operate in that area. Then the local assemblies also play a vital role wherever you find yourselves in terms of their building operating permit for the building itself as well as the need to give impact assessment reports before the building is put up. Then there are habitation permits that you also need to acquire to allow people to live in or use the buildings. Then you also have the EPA who play a very vital role. Their permit focusses on the waste disposal. There are several questions that come up with wastewater and soil waste. Where's it going? How are you treating it? Once it has been treated, does it meet the standard to be discharged?

There is also Fire Service, who would randomly come and check your fire permits and whether your panels are working. Technology has smoothed the processes especially with the installation of sensors to ensure that when there is fire, the facilities manager is able to see in real time who is in the building and which sectors they are in, and this has enhanced the evacuation processes."

Tracking Occupancy

Paul Sheedy shed light on new trends regarding tracking occupancy within buildings. He intimated "So the whole idea of tracking occupancy is absolutely a total necessity now. What we do is we deliver ways of tracking behavior of your tenants to identify clearly where you are going to make cost savings. Your security teams for instance will be able to digitally detect every single breach of security that happens. If someone takes your television screen, we will know who walked out with that, matching the asset moving with the individual who is with it.

Artificial Intelligence (AI) also plays a key role in managing evacuations. For instance, it assists in knowing how long a building will take to evacuate at 10 o'clock in the morning with 2000 people compared to 10 o'clock at night with 20 people. We have a triple technology card that allows us to build what we call virtual doors, where there are no longer internal security doors because we allow occupants to walk in and out freely and therefore not touch against door handles, which reduces the spread of COVID". But it will be the data on real usage that will allow buildings to be far more efficient, enabling targeting on NetZero goals by cutting energy usage by around 30%. Paul ended with a positive outlook on the African continent. "I see Africa in the next 10 years being its golden opportunity for growth, it's going to happen, it's going to see growth far beyond or anywhere else".

WORKSHOP - Introdution to EDGE

Presented by Dennis Papa Odenyi Quansah, IFC Green Building Lead, Ghana. Nigeria, Kenya

Dennis Papa Odenyi Quansah

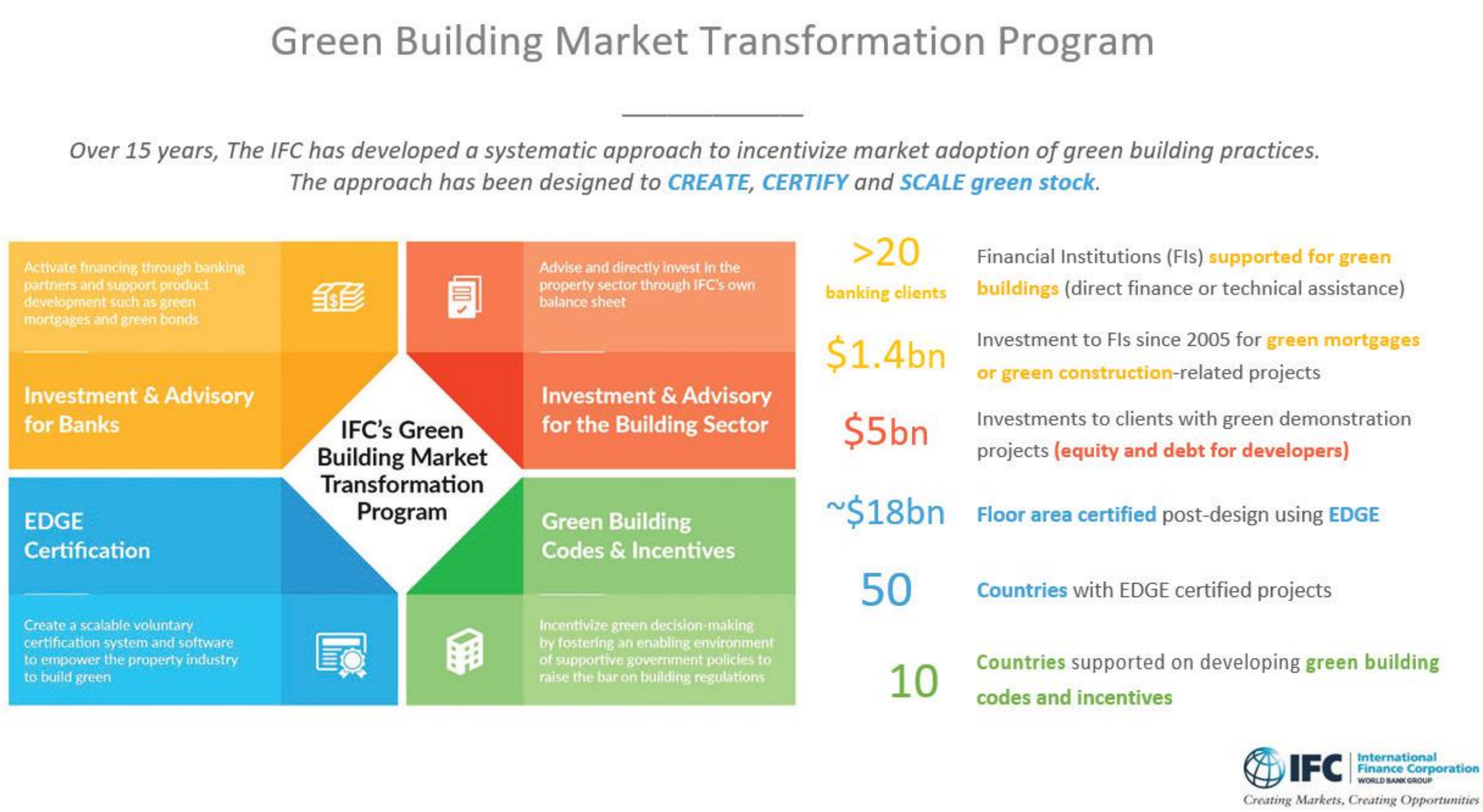
Dennis oversaw the workshop by first providing a brief background on the IFC EDGE program and its mother organization, the larger World Bank Group and then went ahead to get into the various features of the edge program with practical illustrations and simulations. **Highlights of the workshop are presented below:**

IFC'S OFFER FOR GREEN BUILDINGS

Investment
Long-term loans, warehousing facilities, guarantees and risk-sharing facilities, structured finance, green bonds.

Advice
Support in identifying investment pipeline, market intelligence, training for loan officers & developers, sustained technical advice, CAFI Tool, Green Mortgage Toolkit.

Market Creation
Global and local marketing campaigns, stakeholder education, capacity building, technical guidance, promotion of incentives.

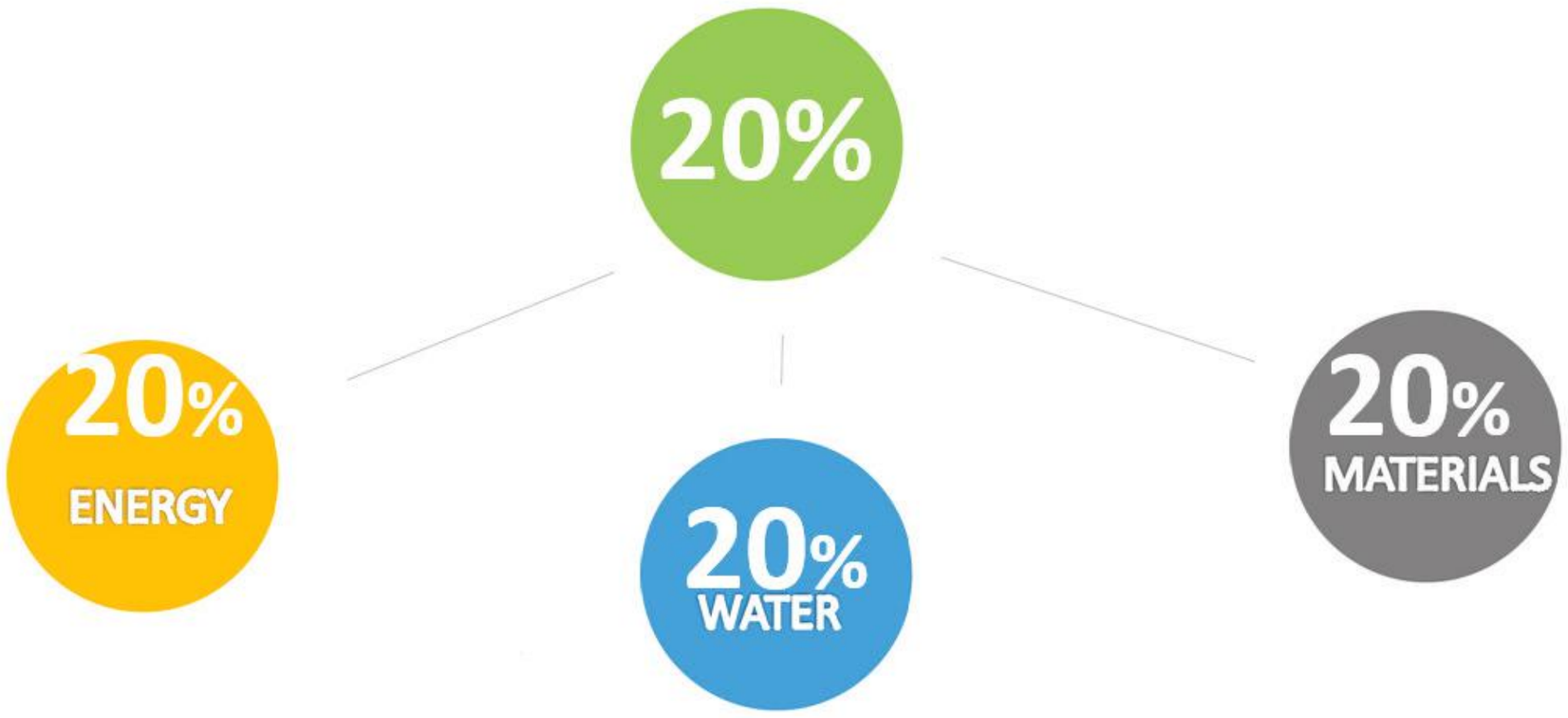


EDGE: EXCELLENCE IN DESIGN FOR GREATER EFFICIENCIES

An innovation of IFC, a member of the World Bank Group, EDGE ("Excellence in Design for Greater Efficiencies") provides market leaders with the opportunity to gain a competitive advantage by differentiating their products and adding value to the lives of their customers. EDGE brings speed, market intelligence and an investment focus to the next generation of green building certification in more than 170 countries. IFC created EDGE to respond to the need for a measurable and credible solution to prove the business case for building green and unlock financial investment. EDGE includes a cloud-based platform to calculate the cost of going green and utility savings. The state-of-the-art engine has a sophisticated set of city-based climate and cost data, consumption patterns and algorithms for predicting the most accurate performance results.

THE **FREE SOFTWARE** SHOWS RETURN ON INVESTMENT FOR RESOURCE EFFICIENCY MEASURES, TAILORED TO LOCAL CLIMATE

THE EDGE STANDARD FOCUSES ON THREE CATEGORIES OF **RESOURCE EFFICIENCY**



Further Resource: EDGE Methodology

IFC International Finance Corporation WORLD BANK GROUP
Creating Markets, Creating Opportunities

EDGE IS AVAILABLE ACROSS **ALL SECTORS**, FOR BUILDINGS OF **ALL VINTAGES**

NEW BUILDINGS

EXISTING BUILDINGS & REFURBISHMENTS

PORTFOLIO CERTIFICATIONS

HOMES

HOSPITALITY
- Hotel
- Serviced Apt
- Resort

RETAIL
- Department store
- Shopping mall
- Supermarket
- Big box store
- Food store
- Airport

OFFICES

HOSPITALS
- Hospital
- Clinic
- Nursing home

EDUCATION
- Pre-school
- School
- University
- Sports facility
- Religious facility

INDUSTRIAL
- Warehouse
- Light industrial

LEVELS OF CERTIFICATION

Excellence In Design For Greater Efficiencies
Edge
CERTIFIED GREEN

Excellence In Design For Greater Efficiencies
Edge
CERTIFIED GREEN ▸ ADVANCED

Excellence In Design For Greater Efficiencies
Edge
CERTIFIED ▸ ZERO CARBON

20%

LEVEL 1: EDGE Certified

Enter your project in the EDGE App and earn a minimum of 20% savings across the three resource categories, and your project can be certified.

40%

LEVEL 2: EDGE Advanced

Set your project apart even further by earning EDGE Advanced, with recognition reflected on project studies, certificates, award submissions and more.

100%

LEVEL 3: Zero Carbon

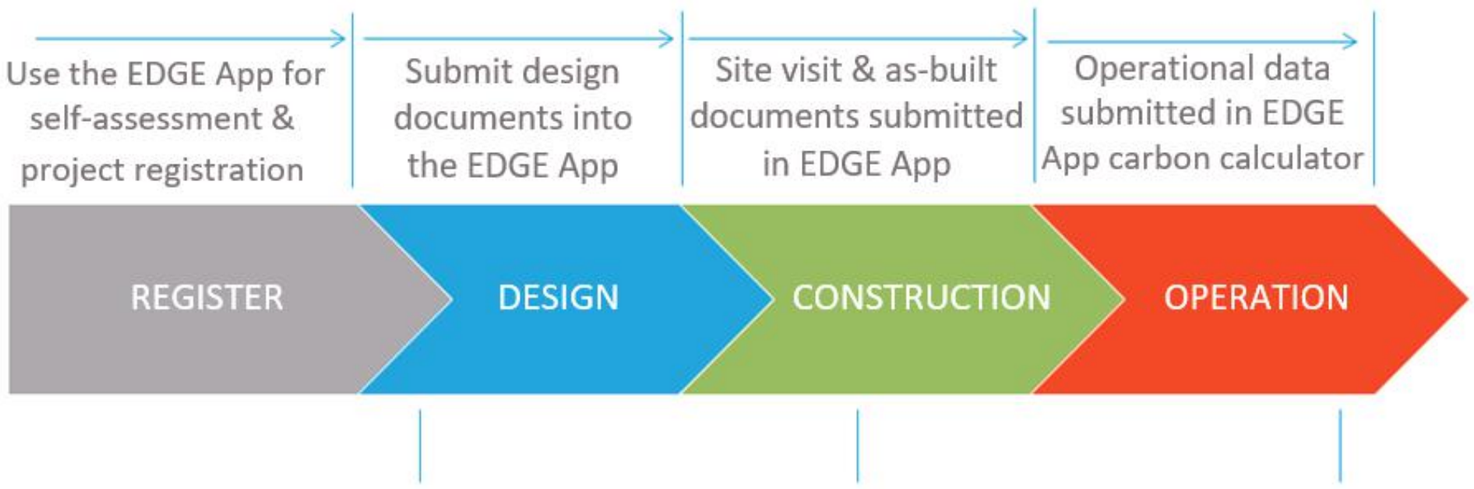
Join the global initiative for new buildings to be zero carbon by 2030 and all buildings to be zero carbon by 2050.

EDGE SIMPLIFIES THE **GREEN BOND ISSUANCE** PROCESS

1.CRITERIA	• EDGE can be used to establish criteria for use of proceeds.
2. SECOND OPINION	• EDGE has been accepted by international bodies as a second opinion, streamlining the process for the selection of assets.
3. ALLOCATION PROCESS	• EDGE certification ensures an easy compliance process without adding an extra burden on the issuer.
4. REPORTING	• EDGE supports environmental impact reporting through the EDGE software.
PROGRAM SUPPORT	• EDGE supports issuers with best practices and technical support.

20

CERTIFICATION WORKFLOW FOR DEVELOPERS



PRELIMINARY EDGE CERTIFICATE OR EDGE ADVANCED CERTIFICATE

- EDGE co-marketing and project study for sales promotion
- EDGE Advanced certificate automatically granted to projects with 40% energy savings

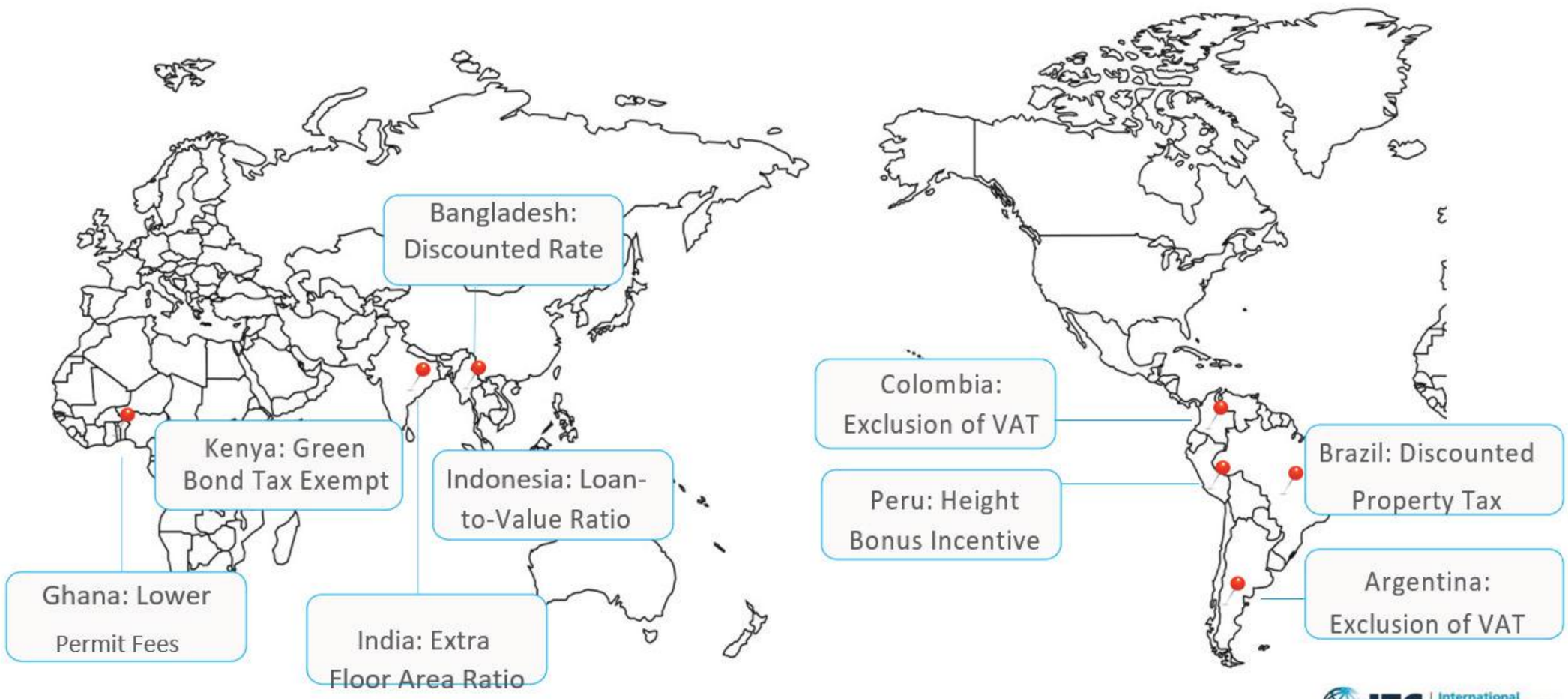
FINAL EDGE CERTIFICATE OR EDGE ADVANCED CERTIFICATE

- Asset certification does not need to be renewed

ZERO CARBON CERTIFICATE

- Project must have one year of operation & 75% occupancy
- Must renew operational certificate every 2-4 years

GOVERNMENT INCENTIVES FOR GREEN BUILDINGS



IFC International Finance Corporation WORLD BANK GROUP
Creating Markets, Creating Opportunities

BANKS ARE PROVIDING INCENTIVES TO CATALYZE THE MARKET

GLOBAL CLIMATE PARTNERSHIP FUND managed by responsAbility	100% coverage of EDGE technical fees, global reach
Banco Promerica	Lower interest rate, longer tenor & grace period, Costa Rica
Bancolombia	Lower loan pricing for green construction & mortgages, Colombia
GRUPO sura	10% refund of insurance premium, Colombia
DAVIVIENDA	Lower pricing for green construction & 50% off certification, Colombia
BANCO PICHINCHA	Technical assistance & free certification, Ecuador

GREEN MORTGAGE PRODUCT NEEDS A PARTNERSHIP WITH DEVELOPERS FOR A **SUPPLY** OF GREEN HOMES

CASE STUDY: BANCOLOMBIA, COLOMBIA

- Offered incentives for green construction to all of their developers.
- Educated developers in road shows on how to access green construction loan.
- Developers instruct home buyers to seek their mortgage with Bancolombia.
- Buyers also get a preferential rate.

Further resource: EDGE Banking Page

CASE STUDY: ABSA, SOUTH AFRICA

- Worked with only one developer, Balwin Properties to launch EcoHomes product.
- Balwin commands a large portion of the housing market and committed to its entire portfolio EDGE certified.
- Largest registration for EDGE certification, totaling 16,000 units.
- Bank is confident in pipeline of projects, even if with 1 developer.

Further resource: EcoHome Press Release

Panel Discussion

Funding Options for Green Projects

Nana Yaw Kwakye

Anele Makhwaza

Eric Appiah

Benjamin Gyepi-Garbrah II

Cheick Sanankoua

THE PANEL **CHEICK SANANKOUA**, Managing Partner, HC Capital Properties, UK & Ivory Coast
BENJAMIN GYEPI-GARBRAH II, Managing Director, SATIG LLC, Ghana
NANA YAW KWAKYE, Investment Director, IFU
ANELE MAKHWAZA, Founder & CEO, Igugu Global, South Africa

MODERATOR **ERIC APPIAH**, Managing Partner, Black Star Group, Ghana

Green buildings represent one of the biggest investment opportunities of the next decade—$24.7 trillion across emerging market cities by 2030. While access will lead to economic development, Africa has been slow to tap into this pool, in part, due to misperceptions within international financial institutions about regional risk as well as a general ignorance about the markets. This session sought to share tips on how to scale this challenge, as well as share insights on successful green finance models across the continent, to inspire greater uptake and growth of green project investments.

SESSION NOTES

Challenges in Accessing Green Finance

Anele Makhwaza in speaking to the seeming blockage of capital or inability of African organizations to access some of the investment opportunities in the green finance space, offered a few pointers. She indicated that "there's no shortage of money, but somehow projects on the continent don't get the finance that they deserve due to a few reasons she found out speaking to investors in the Global North, Europe and in the USA. She and her team found out that project developers have a burden of packaging their projects to market in a bankable fashion in addition to facing the potential risk of organizing their data to meet sustainability mandates. She also found out speaking to the New York pension fund, who though have a $3 billion mandate for Africa but yet to allocate even $1, that they felt they didn't really understand the continent very well and they certainly didn't understand the climate related investments opportunity.

The second challenge and feedback they got from engaging these investors had to do with cheque sizes and aggregation. Her firm then built a first-of-kind climate adaptation and access to market platform that allows project developers to manage their sustainability data and tap into a green finance registry they have built across development finance institutions, banks and private equity etc. because she reckons, the only difference between vanilla finance and green finance is this condition around being able to maintain transparency around the underlying use of proceeds and demonstrating that it is going towards an environmentally beneficial cause. She believes that with this digital capability enabled, it would catalyze a carbon transition, since Africa is the highest point of leverage when we think of our climate future.

Emergence Plaza Case Study

While there have been challenges to accessing green finance and investments, there have been a few success stories that are worth celebrating as they can inspire other project developers to make the big leap to access such funds and bonds. In August 2021, Cote d'Ivoire's Emergence Plaza successfully issued an oversubscribed green bond for its Cosmos Yopougon retail complex at a 7.5% yield. The $18 million equivalent long-term paper was issued in the CFA franc local currency. Speaking at the Summit, panel member, **Cheick Sanankoua**, co-founder and managing partner of HC Capital Properties, which developed, financed and manages Cosmos Yopougon in partnership with the project's lead global investor SFO Capital Partners, indicated that the though the journey to a successful green bond issuance was hard and long, their commitment to ensure sustainability of the project ensured a realization. The project has achieved EDGE Certification not only meeting the minimum 20% savings in material and energy thresholds but exceeding it between 30 -45%. With the bond 30% oversubscribed, there is clear confirmation that there is enough appetite to do similar ticket deals as they look to take the zero carbon pledge in years to come, so all of their developments move towards zero carbon in the future.

Answering a question from the moderator **Eric Appiah** regarding managing the FX risk, Cheick indicated that their situation was a bit different from that of Ghana and Nigeria for instances as the bond was actually issued in the local CFA currency. He said "the bond is 100% in local currency and we are in a low inflationary environment, 2 or 3% inflation. So that's the one advantage with this region where you don't have to deal with that. I think in the Ghanaian, Nigerian and Kenyan context, it's a bit different because you have the mismatch between your dollar leases, that really are local currency leases, because we have seen during the crisis that you sign a lease in dollars, and when the currency goes down, say 25%, you are going to renegotiate your lease".

Impact Financing

Nana Yaw Kwakye mentioned that at IFU (Investment Fund for Developing Countries), they approach green finance in two ways:

1. IFU directly fund green projects by evaluating risks of projects that have strong green elements and particularly prefer projects that attract internationally acclaimed certifications, like IFC's Edge Certification.

2. IFU also indirectly supports green projects by providing funding to banks who then can only lend to green businesses that naturally cannot attain financing directly due to size, and other dynamics. IFU partner banks that are strong on green principles and are willing to abide by its sustainability standards and rules. Nana Yaw mentioned that in 2020 for instance they did a deal in Nigeria, in a company called Daystar together with Proparco, STOA Infrastructure Fund and Morgan Stanley Climate Fund, at a total value of $38 million. The transaction was essentially a distributed solar transaction targeted at installing solar for industrials and corporates across West Africa.

In answering a question from the moderator, Eric Appiah, as to whether there are particular areas the IFU wont fund. Nana Yaw mentioned that they are less active in the commercial property space, but they very much support property projects that have direct link to particular SDGs. It is for that reason why they support projects like the development of students' accommodation projects for instance, since it supports education (SDG 4) by providing the right environment for students to learn and thrive.

Development of Green Bond & Mortgages Market

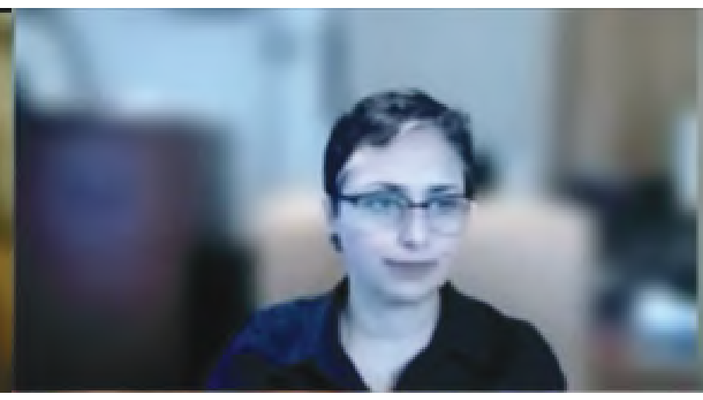
Regarding emerging green bond and mortgage programs, **Benjamin Gyepi-Garbrah** recapped his organization's journey in the transition to climate and sustainable finance which started back in 2012, when they were mandated to act as a transaction adviser while working with the DBSA. They helped introduce project bonds as an innovative way to finance the gas to power program and a number of renewable energy projects. From that experience working with DBSA, his organization has developed solutions in terms of designing green bond, framing green bond frameworks for respective clients. They have done that by bringing on partners such as GreenSquare Ventures, to assist. Collectively they act as sustainability leader and support private and the public sector stakeholders on the issuance of securities with a positive financial, environmental, social and governance (ESG), and climate impact.

Benjamin also mentioned that Ghana is making headway with the development of the green bonds framework with the SEC and also the NPRA, providing certain incentives to pension funds with allocation of their funding to support green bond initiatives. These initiatives are key as they now allow smaller transactions that require local currency to be able to access that. Benjamin also mentioned they have been assisting Ghana's National Mortgage Housing Fund with their strategic plan---with an emphasis placed on the possibility of issuing green mortgages. They have also been engaging the local banks to create green mortgages that will incentivize customers to utilize solar panels, sustainable insulation (i.e. GCS Fibers) and actually get their homes/building to a point where they are green/above 25% energy efficient, given the cost savings and potentially providing an opportunity to make it easier to service these mortgages.

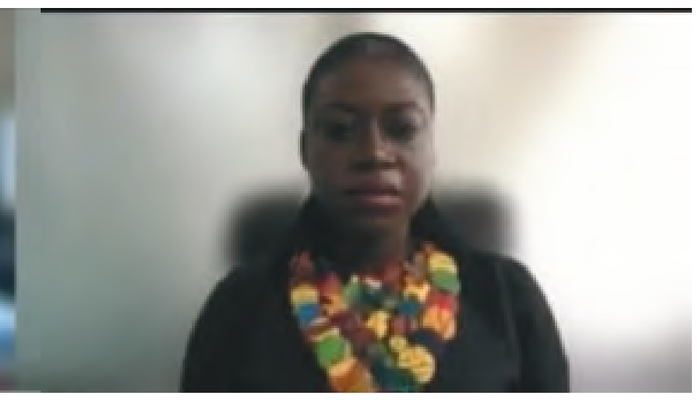
Panel Discussion

The Zero Game – Is the Race to Net Zero Buildings a Fad?

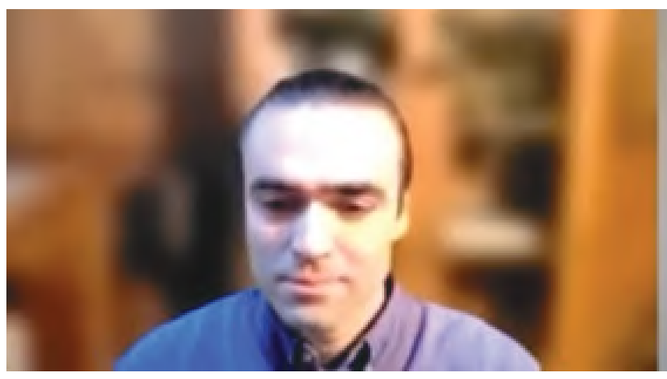
Chilufya Lombe



Smita Chandra Thomas



Pauline Anaman



Alexi Miller

Solome Girma

THE PANEL **SMITA CHANDRA THOMAS**, Founder & Principal, Energy Shrink, USA
PAULINE ANAMAN, External Advisor, Africa: EU H2020 Negative Emissions (NEGEM) Project
ALEXI MILLER, Associate Technical Director, New Building Institute (NBI), USA
SOLOME GIRMA, Program Management Director, DC Sustainable Energy Utility (DCSEU), USA

MODERATOR **CHILUFYA LOMBE**, Partner, Solid Green Consulting, South Africa

As the world attempts to navigate a net-zero transition by 2050, Africa is bracing for a huge demographic shift. More than half of the 2 billion people who will be added to the global population by 2050 will be Africans. Buildings play a key role in this transition hence our focus on Net Zero Buildings, with particular emphasis on the African situation. This session sought to assess whether the race to net zero is borne out of a genuine threat or is it just one of many fads in our time?

SESSION NOTES

Net Zero Buildings

Solome Girma provided context to her presentation by defining Net Zero Buildings. A Net Zero Building, she mentioned is an energy-efficient building, where on source energy basis, the actual annual energy delivered is less than or equal to the on-site renewable exported energy. It is essentially a balance between energy consumed and produced. She indicated that whether the building is sited in Ghana or the USA, there are common operational elements like lighting, cooling and heating that enable us to meet our everyday household needs like powering water heaters, fans, pumps, computers and charging our phones etc. These activities consume a lot of energy and it only makes sense we balance what we consume versus what we produce. To achieve this balance, she recommended that first and foremost there is the need to ensure buildings are energy efficient through everyday operations and maintenance management with the goal of at least achieving 50 – 70% reduction from standard buildings that exist today without the Net Zero concept behind it.

Impact through the School System – The US Example

Solome indicated that from her base, the US Government decided to focus attention on schools taking up net zero programs mainly because the numbers made economic sense. In the US, there are about 131,000 schools with 50.6 million students and 3.5 million teachers. In addition to the numbers, the schools made for excellent models as the potential for effective knowledge transfer through new generation education could not be missed. She said “There are school kids who get to play with the solar panels and really learn first-hand how these buildings operate and then through energy efficiency programs, reduce energy. Having the schools as one of the first places to start investing in was thus a no brainer.”

Making the Business Case

Smita Chandra Thomas in her presentation offered a slight variation on the definition of Net Zero Buildings from Solome’s. Smita said “We have to remember that even though we may be balancing the energy we are drawing from the grid with what we are exporting from our solar panels, the energy being produced on the grid is still producing greenhouse gas emissions. The building may be Net Zero, but those emissions from the grid are still going into the air. And once they are in the air, they stay in the air for hundreds of years.

So, the goal for all of us should not be just Net Zero, the goal for all of us should be Zero use of Fossil Fuels, because that's what creates greenhouse gas emissions. We need energy to live, we need energy to work, but we do not want to get it from fossil fuels. That's the goal." She further pointed out that there is a strong business case for green buildings in emerging economies because: Buildings consume large amounts of energy; The demand for new buildings, especially housing, is booming. Africa is one of the fastest growing regions in the world, and the African construction market is expected to grow at a rate of 6-7% over the next 5 years.

The utility costs for both residential and commercial sectors is very high in Africa. In housing, annual energy savings in homes can cost more than a month of rent. Net Zero buildings make enormous sense for these reasons. Examples around the world show that net zero buildings can be attractive, modern, and built at commercially competitive costs. They can even come in under budget if the project team utilizes integrated design principles from the project outset. Commenting that designing for net zero is both an art and a science, Smita emphasized that an understanding of how a building interacts with the grid can produce even better results.

Challenges with Going Green in Ghana

Pauline Anaman in her presentation provided context on Ghana's state of readiness to go green even before leaping to net zero by recapping a study she conducted. The study was on how individuals and companies are interested in investing in green buildings considering the potential benefits that it brings. She revealed that the key finding is that in Ghana there is a link between green buildings and property values but that link or realisation of that value is not possible in our present situation, rather in the future. The reasons she adduced for that situation range from first and foremost, people not having the requisite knowledge about the importance of green buildings, to low awareness as well as people being comfortable with the building methods that exist now. People are also not being proactive by taking steps to realise the importance of green buildings for the environment, for their bottom line and also for their businesses. There are also the high investment costs, in Ghana particular, it is difficult to get cheap financing for green buildings and even when they source funding from the banks, they have to contend with high interest rates.

In scaling the challenges to realise the benefits of going green, Pauline mentioned that beyond awareness creation, government needs to push legislation and regulation that will promote uptake, noting that some of these interventions have started with IFC leading a revision of building codes which should soon be passed into law.

The Five Foundations of Net Zero Buildings

Alexi Miller in his presentation shared key trends and findings from the Getting to Zero Buildings Database. This database tracks the roughly 730 Net Zero energy and carbon-neutral commercial and multifamily buildings across North America. While Net Zero buildings can be found across the world, Alexi built from his North American experience to identify important findings for the world at large and for Africa in particular. The central theme in his presentation was the five foundations of the Zero Carbon buildings – namely Energy Efficiency, Renewable Energy, Grid Integration + Storage, Building Electrification, and Life-Cycle Impacts. Each of these is important in their own right, but a best-in-class zero carbon building team should consider how to optimize project outcomes in each of these foundations. Alexi noted, "we know from experience, drawing from our database of 700+ net zero energy buildings in North America, that there are many pathways to a green building, all starting with energy efficiency.

A wide range of proven and emerging solutions are available to make buildings more efficient, cleaner, more affordable, healthier, and safer. African zero carbon and high-performance building professionals can learn from past successes and challenges, both at home and abroad, to leapfrog past many dead ends to make buildings part of the solution to the climate crisis. I know this is not a fad where I live nor is it a fad in many other parts of the world." Alexi noted several key lessons learned by leading project teams with net zero building experience, including setting aggressive energy performance targets early in the process and getting strong commitments from all decision makers to achieving the targets. Median performance from verified net zero energy in North America is about 60 kWh/m2/yr; the great majority of net zero energy buildings use less than 100 kWh/m2/yr.

The importance of efficiency first was really brought home by Chilufya as the moderator, who summarised the discussion. "We saw first-hand examples of just how energy efficient buildings have to be to achieve net zero. We saw how achievable that really is in practice, with hundreds of project examples. Typical net zero energy building energy usage was 40%-60% less than one of the most stringent energy codes in the world (the 2021 International Energy Conservation Code). We also saw the important role that building codes can play in setting the right environment for energy savings." The race to Net Zero is definitely not a fad. It is an opportunity to not only solve a serious environmental issue but also to create a resilient, affordable, healthy building stock that is energy efficient enough to solve energy supply issues that are a burden to development in Africa.

Post Summit Actions

RESEARCH & THOUGHT LEADERSHIP

Develop a White Paper with proceedings from the Summit

SKILLS DEVELOPMENT

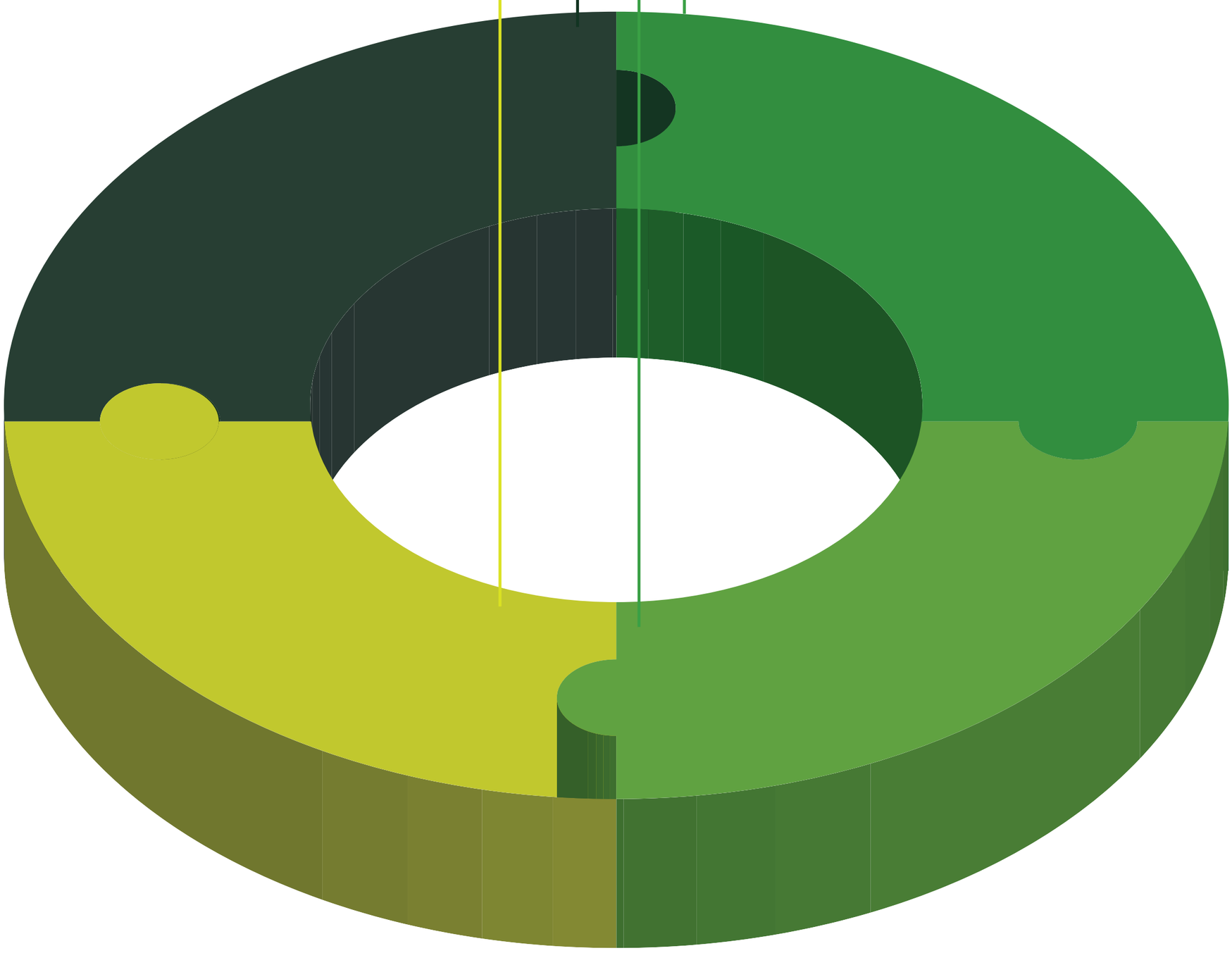
Establish a skills development program to train and equip trainees especially women with relevant green building construction and project management skills

FINANCE & TECHNICAL ASSISTANCE / BUSINESS ACCELERATOR

Establish a finance and technical assistance program to scale up SMEs and innovators in the green building and sustainable material space to scale up their operations and output

PARTNERSHIPS

Develop partnerships to provide funding options for individuals and corporates to encourage and increase the consumption and adoption of energy and water efficiency measures, renewable energy at both commercial and consumer levels.



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GHANA INSTITUTION OF SURVEYORS (GhIS)

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Appreciation

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Ministry of Energy - Ghana

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Ghana Institution of Engineers – Ing. David K. Nyante, Executive Director; Ayishetu Osmanu, Administrative Officer
Ghana Institute of Planners – Pln. Mohammed Alhassan (FGIP), President; Anthony Kanyi Foli-Adade, PR

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Rachael Mugendi – Ashesi University
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Asher Chakupa – Ashesi University (From Zimbabwe)
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Addakwei Emmanuel – Ashesi University
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“

The environment and the economy are really both two sides of the same coin. If we cannot sustain the environment, we cannot sustain ourselves

”

Wangari Maathai

GHANA GREEN BUILDING SUMMIT 2021

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