



# GREEN BUILDING IN AFRICA

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# Introduction

When it comes to delivering iconic projects that require a meticulous level of planning and development, Alpin proudly stands out.

Alpin is an independent consultancy firm offering holistic service packages for the built environment. Our consultants work across all sectors and scales (policy development, airports, rail, government facilities, data centers, critical infrastructure, etc.) to develop strategies and solutions for real estate and built asset management at all stages of the built asset life cycle, including design, construction, and operation. Our clients – from designers to high-profile contractors, project managers, consultants, and government bodies – rely on our expertise in Commissioning, Sustainability and so much more to produce outstanding results. By optimizing systems and using the most cutting-edge technology and software available, we can visualize the end result, pre-empt any possible challenges, reduce construction costs and waste, and ultimately deliver iconic projects that the region can be proud of.

From mega-ports, master plans, airports, and metro stations, to stadiums, train stations, and road networks, our name has become synonymous with the realization of major infrastructure in the region. High-level developments such as these require long-term planning and commitment, and the ability to scale operations to meet complex requirements. Our teams excel at this challenge. Proof of this is our portfolio, which includes more than USD 25 billion worth of infrastructure projects, in addition to five international airports and five major metro networks.

Alpin's integrated and holistic approach draws on core skills in Building Services Commissioning, Sustainability, Energy Modeling, Workplace Consulting, Building Physics, and Digitalization. Our multi-disciplinary team of consultants has helped many developers, consultants, and contractors implement Green Building best practices on many of the most prestigious projects in the Middle East and we're proud to have partnered with some of the biggest names in the GCC.

The next big thing for Alpin is to expand our presence in Africa with the help of our growing pool of consultants. We have already started working with local professionals on megaprojects in Egypt to great success and intend on assisting more countries on the continent to change into greener economies of the future.



## An Overview of Green Building in Africa

The African continent is changing fast. By 2050, its population is projected to have grown by 1.3 billion people, more than half of the world's projected population growth<sup>1</sup>. It also happens to be home to some of the world's fastest-growing economies.<sup>2</sup> After taking quite a hit in 2020 due to the COVID-19 pandemic, the GDP in both North and Sub-Saharan African regions are projected to recover and grow (4.9% and 3% respectively), with countries like Botswana, Libya, Niger, Chad, and Rwanda taking the lead.<sup>3</sup> This means the continent will face a tremendous task of urban planning, something it has been investing in for some time now.

This growth presents both challenges and opportunities. Unless it's paired with a shift to renewable energy, global climate change will present a greater threat to Africa's food, health, and economic status quo. Around 47% of the urban population resides in informal settlements or slums and do not have access to safe, affordable housing.<sup>4</sup> At the same time, the role of the built environment in several African countries is more distinct than ever due to the growing population and urbanization. Higher urban densities have not only contributed to increasing consumerism that has led to local degradation but also to higher carbon emissions.

Creating jobs and reducing poverty are also key issues for the region. The United Nations Economic Commission for Africa approximates that youth in Africa make up 35% of the working-age population but are 60% of the total unemployed.<sup>5</sup>

The good news is that some African countries are positioned for rapid economic growth. Setting a sustainable foundation that outlasts modern methods of construction is an opportunity that already existing cities do not

have. The investment into green construction has multiple benefits; it facilitates growth while addressing issues like employment, climate change, and poverty. That's why more and more countries are turning towards building green cities across the continent. These cities are planned so that international living standards are incorporated with the local environment, materials, and most importantly, people.

While African governments contribute the majority of funding for construction projects in their countries (22.8%), countries like China are investing in Africa's construction industry (20.4%), making it the second-largest source of funding, as well as the primary builder of projects across the continent.<sup>6</sup> Private domestic firms make up the third-largest source; there is clear interest in and support for developing the built environment in Africa, nationally and internationally.

The increase in green building activity is seen in other ways too. Since 2007, the World Green Building Council, a global action network that aims to transform the construction sector, has spearheaded the effort to make Africa's commercial property sector sustainable.<sup>7</sup> Starting off in South Africa, it provides tools, training, and knowledge and promotes green building practices that will fundamentally improve construction. Members of the Green Building Councils (GBCs) across Africa include Ghana, Kenya, Mauritius, Namibia, Rwanda, South Africa, Tanzania, and Zambia.<sup>8</sup>

One of the tools used is the GBC South Africa's (GBCSA) Green Star SA rating tool, which is based on its Australian predecessor. It caters specifically to the South African context. This rating tool sets standards for minimizing the environmental impact on developments by rewarding projects for criteria such as reducing waste sent to landfills and creating more resource-efficient designs. So far, the tool has been developed and modified for Nigeria, Kenya, Ghana, Rwanda, Namibia, Mauritius, and Uganda with the GBCSA working in collaboration with the relevant Green Building Councils to certify buildings in these countries.

As another example, LEED certification is an internationally recognized rating system that is commonly used across many African countries. Some of the landmark projects that have been LEED-certified include Knowledge City and Cairo Business Park in Egypt, Proctor and Gamble Lagos Mastersite in Nigeria, Residencia Dorthea in Uganda, and Medina Tower in Libya.<sup>9</sup>

In this way, several African countries have already begun to lay the foundation for sustainable development and growth.



## The Importance of Green Building

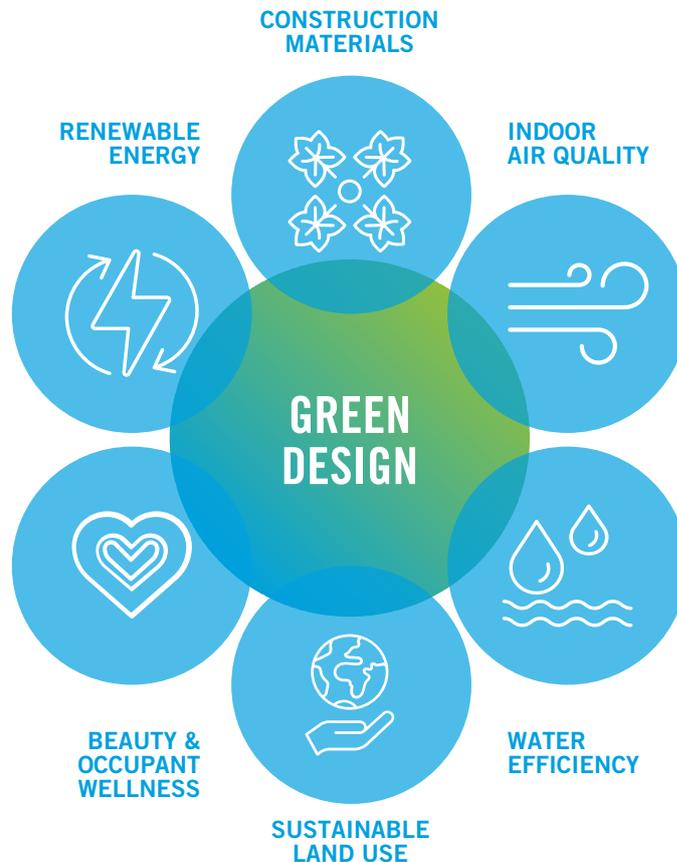
80% of the buildings that will exist in 2050 in Africa have not yet been built.<sup>10</sup> At the same time, the building and construction industries are the cause of 39% of carbon emissions globally.<sup>11</sup> With this in mind, it's clear that African cities can become some of the foremost examples of truly sustainable cities. These long-term and large scale projects are now in focus as more and more of the region's leaders are realizing the value of green construction and its benefits to increase access to clean water and reliable, renewable energy.

Not only is there a significant impact on the built environment, but green buildings are also healthy buildings for the people that occupy them. Green building materials are non-toxic, natural, and organically compound. They have the immense potential to reduce the overall impact on the environment and people. International certifications such as LEED and WELL make sure of this and are easily adaptable to regional differences as they encourage using local and cultural resources to bring a sense of community.

People spend 85-95% of their time indoors.<sup>12</sup> Poor ventilation and indoor air quality, noise, poor design, and humidity levels can cause health problems like headaches, nausea, and fatigue.<sup>13</sup> They make it easier for germs to spread and serious long-term problems like asthma to develop. In the past year, we have seen several different virus outbreaks including COVID-19, SARS, and Swine Flu. Optimizing building ventilation systems and designing buildings in the right way, such as allowing more daylight in while maintaining thermal comfort, are some of the ways green buildings benefit the occupants.

Green buildings are also proven to have consistently achieved higher occupancy and rental rates, as well as higher sales prices according to a study by CoStar and US San Diego.<sup>14</sup> Research on green buildings has also shown that buildings built with the health of occupants in mind attract a rental premium of up to 20%.<sup>15</sup> When compared with conventional buildings, green buildings were also shown to achieve energy savings of up to 33%.<sup>16</sup> Overall, sustainable buildings focus on health and wellness and provide benefits both in short and long term investments.

Countries like South Africa and Egypt are leading with attempts to increase their usage of green buildings. The financial advantages of green designs are many; however, policy, ownership, and business structures pose the greatest threat. Many governments, such as those in South Africa, are working to untangle the knots and encourage green buildings by setting building codes, tax-based bonuses, zoning regulations, preferential treatment for green developers, and so forth. As many African countries have year-round access to solar energy, green building methods that incorporate renewable energy sources such as solar panels also strengthen the case for green building on the continent.



The COP21 Agreement and the UN's strategy to channel funding into promoting low carbon growth in Africa has encouraged property developers to

start to tap into green funds to invest in green building developments. Furthermore, green building techniques are supported by demand offset programs (in which a developer minimizes energy and water demand as the condition of permitting); preferred acquiring; tax transferring; and government-supported study, growth, and academic programs.<sup>17</sup>

On the whole, green building will be an imperative tool to advance the sustainable growth of African nations, and will serve as a solution to many existing issues across the continent. Now more than ever, there is a greater need to re-examine the fundamentals of the built environment around us, and having the right strategies in place for the future of the building industry is crucial to see a complete landscape change resulting in a greener Africa.

# The State of Green Building

Across Africa, sustainability demands a different interpretation for different countries. While some African countries like South Africa and Egypt have closely aligned their goals with the Paris agreement of 2016, for other nations dealing with fundamental issues such as economic development, food security, water shortage, and general wellbeing, issues like environmental protection become secondary. To this extent, it is important to construct a model where sustainability is built into the local environment, using materials and methods that address country-specific issues, especially to combat existing key barriers to the green building movement such as lack of public awareness, shortage of skilled professionals, inadequate urban planning, etc. that would hinder the development of green cities.<sup>18</sup>

Nonetheless, as the state of green building is growing in importance in Africa, governments in countries like South Africa, Egypt, and Kenya are already introducing benchmarks for energy-efficient buildings, while NGOs and other industry professionals are setting up green building councils in South Africa, Egypt, Tunisia, and Nigeria, to encourage sustainable design.

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*As the most populous Arab state, the primary environmental concerns in Egypt are related to the pollution of the Nile, which is the country's main water source, and a stronger reliance on solar energy. It is approximated that 25% of the buildings will run on solar-powered electricity in the future, according to Darwish Ahmed Hassanin, CEO of SECON.<sup>19</sup>*

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*In Kenya, a new framework has been developed with the Kenya Green Building Society that is tailored to the Kenyan environment, and accounts for the needs of Kenyan people and the use of Kenyan materials.<sup>20</sup>*

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*In Rwanda, the country's Economic Development and Poverty Reduction Strategy II (2013-2018)<sup>21</sup> is utilizing a green address economic transformation and has approved the Rwanda Green Building Minimum Compliance System.<sup>22</sup>*

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*In Ghana, the National Housing Policy has included an Eco-Communities National Framework.*

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*In Tanzania, private initiatives are encouraging the development of green affordable housing, lowering utility costs, and improving quality of life.*

In the African construction industry, the top three projects are split between Oil and Gas and Energy and Power, with the latter accounting for two-thirds. Together, they represent 13.3% of the continent's combined project value. Building a reliable power supply across Africa is key to unlocking the economic aspirations of the continent. However, this requires an immense investment that national governments can not afford alone.

National governments are major owners in these projects (74.8%) with private domestic companies as the second biggest owners (9.7%). Recent years have seen an increase in international investments from China (2.4%) and the Middle East (2.2%). China funds one in every five projects across Africa (20.4%), making it the second-largest funding source after African governments, followed by Private Domestic firms (10.8%), and International DFIs (10.2%). There is a lot of investment in the Energy & Power Sector in Africa already and the coming years look brighter, leaving an enormous scope for transitioning into sustainable energy and building green cities.

To learn more about the importance of and progress in sustainable building in Africa, we'll take a closer look at the following countries: Egypt, South Africa, Nigeria, and Morocco.

# Deeper Dives

## EGYPT

Egypt has undergone significant changes to its healthcare, education, and economic reform policy over the last decade. According to CAPMAS 2019 report, the population size rests at 103 million, the largest in MENA and the third largest in Africa, with an annual growth rate of 2.6%.<sup>23</sup> Over 60% of Egypt's population is under 30 and has an increasing need for employment. The growing young population accompanied with easy access to the global expectations for better services is what pushed the previous governance into some serious restructuring.

After the 2011 uprising, corrective economic reforms had rippled to increase inflation by 300%. It was only in 2019 that the stabilizing effects of such reforms became clear. Increased investments in the construction of national mega-projects, energy infrastructure, and new nodal smart cities are assisting in rapid job creation.

While Egypt joined the World Green Building Council in 2009,<sup>24</sup> it wasn't until 2016 that the country took steps to establish its very own national green economy. The official statement released by the Ministry of Environment detailed a gradual adoption of environmentally friendly products and sustainable technologies.<sup>25</sup> In 2020, Egypt's Minister of Planning and Economic Development, Hala El-Said, announced the government plans to invest USD 27.6 billion in 691 green projects over the coming years —14% of total public investment planned for the fiscal year.<sup>26</sup>



According to a Deloitte study in 2019, the GFCF in Egypt is forecasted to reach 22.1% in 2023, fueled by rapid developments in the hydrocarbons sector.<sup>27</sup> The scope of green construction in Egypt has been slow to grow but industry professional Hoda Ibrahim, Sustainability Consultant, USGBC Faculty, and Board Member at Egypt GBC, says *"Egypt already has two local rating systems in place called TARSHEED and the Green Pyramid Rating System. These, along with EDGE, LEED and WELL are used in various projects around the country. The government and stakeholders now see potential in implementing green building concepts and we will slowly see the new projects in the New Capital getting a push towards being green certified."*

Still, Egypt is leading Africa with real estate projects under construction in the region with 18 projects, the most noteworthy being Egypt's Oasis Mega Urban Development Project, a mixed-use development project. Another notable project undertaken is the Electric Train Project. Once completed, the project is expected to save about USD 130 million in fuel subsidies linked to car traffic per

year. It will also reduce traffic on the highway linking the capital to Ismailia, by 30%.<sup>28</sup>



## SOUTH AFRICA

Examining South Africa's success at implementing green building into their cities requires a unique lens. Their idiosyncrasies are isolated on the continent and contribute heavily to the blossoming South African economy. According to a report released by Statistics South Africa, the population of South Africa in 2020 is estimated at 59 million. However, there has been a sharp decline in construction since 2017 which is caused by an economic slowdown and weak investor and consumer confidence.<sup>29</sup>

Nonetheless, South Africa is leading Africa's green building sector.<sup>30</sup> Two green building tools are widely used in South Africa: Green Star South Africa and EDGE. These work alongside international rating systems like LEED and WELL. Both Green Star and EDGE have been adapted for the local South African context, especially in light of the South African National Standard 10400 Part XA that deals with optimizing energy efficiency in buildings.<sup>31</sup> According to the Green Building Council of South Africa (GBCSA), there are more than 500 certified green buildings with the number steadily increasing as the government continues to support its 2030 goals.<sup>32</sup>



This is credited to the resilience of the South African government, which has successfully set up policies and regulations that are making it easier for the country to transition into a green economy at every level. Over the 357 incentives active in the country, 50% of them were funded by national

government departments while 31% are municipally funded.<sup>33</sup> There are additional grants and concessions provided by the government to increase investors' interest in going green. One such example is the Green Fund of South Africa, which is "structured to reflect national green economy policy priorities and the complex cross-linkages between macro-economic and sectoral policy focus areas". The fund supports projects on various phases of the value chain, from pilot to scale-up.

Over two million sq.meters of South Africa's landscape is covered by certified green buildings that reduce water consumption, electricity, and waste disposal. These communities have a consequential impact on the construction industry's carbon footprint.<sup>34</sup> 50 certified projects are projected to result in a yearly savings of 76 million kwhours — equivalent to the electricity needed by 5,300 households yearly; equivalent to having 28,000 fewer cars on the road; enough to sustain 34,000 households for a year.

South Africa, much like the other countries on the continent, faces key challenges such as poverty, low levels of education and unemployment, as well as an urgent need for economic growth. The Cape Town Water Crisis of 2018 was a tipping point for the South African government to reanalyse the key issues and develop strategies to ensure something like this never happens again. Despite these difficulties, South Africa has established a fortunate groundwork for the future of its construction industry. Opening up more financing options for key stakeholders is the best way to promote the development of sustainable communities and the benefits will reflect on the environment, the economy, and the overall social responsibility.

## NIGERIA

Nigeria is the country with the largest population in Africa, with a current population of almost 201 million people.<sup>35</sup> This number is forecasted to double by the year 2050.<sup>36</sup> At the same time, the urban population makes up 51% of the total population in Nigeria.<sup>37</sup> The construction industry is expected to be worth 13 trillion Nigerian Naira by 2024 (USD 34.6 billion).<sup>38</sup> This means that Nigeria provides plenty of opportunity for the green building sector. Being one of the biggest emitters of greenhouse gases on the continent, the Nigerian government has recognized the need for change, and the nation has pledged to achieve a 20% reduction in its greenhouse gas emissions by 2030 - 45% with international support.<sup>39</sup> Green building will be a big part of this change.

As of 2019, 16.6% of the total number of construction projects on the continent were located in West Africa, with Nigeria housing 28% of these projects. Altogether the projects are valued at USD 54.2 billion.<sup>40</sup> Some of the biggest construction projects in the country include Eko Atlantic City,<sup>41</sup> Centenary City, and Port of Onne Complex. The largest project in the region, Centenary City, is a smart city to be built from scratch on a plot of land spanning 1,260 hectares in the Federal Capital Territory of Nigeria.<sup>42</sup> The city prioritizes the conservation of surrounding nature, and aims to be socially and economically viable by

combining principles of sustainable urban design principles with progressive land use.



*Credit: Centenary Economic City*

A growing number of development projects in the region are striving to meet sustainability standards; a handful of projects across the country have already achieved the LEED green building certification.<sup>43</sup> National guidelines such as the Nigerian National Building Code, developed by the National Council on Housing and Urban Development, and the Building Energy Efficiency Guideline (BEEG), launched in 2016 through the Nigerian Energy Support Programme, also support the agenda of sustainable development in the country by setting requirements for occupant health and safety, use of local and safe building materials, energy efficiency, and so on.<sup>44</sup>

Several governments and companies are already investing in the West African construction industry, with the majority of investments coming from national governments (28.0%) and China (25.3%), followed by private domestic and international funding.<sup>45</sup> Overall, in order to meet the needs of the ever-growing population, and the consequent housing deficit,<sup>46</sup> green building seems to be a necessary step for the growth of the Nigerian economy.

## MOROCCO

As of 2019, Morocco has a population of over 36 million people<sup>47</sup> with the urban population making up 63% of it.<sup>48</sup> After a 6.9% contraction of GDP growth in 2020, Morocco's GDP growth is forecasted to resume in 2021, and growing with an average rate of 3.1% throughout the next 4 years.<sup>49</sup>

The Moroccan construction industry is forecasted to be worth MAD 129.6 billion (USD 14.4 billion) by 2024.<sup>50</sup> In 2019, North Africa had 19.2% of the total number of construction projects in Africa, with Moroccan projects making up 17.9% of the projects in the region.<sup>51</sup> This number is set to grow as a result of the growing urban population, which, according to the Moroccan Social, Economic and Environmental Council, is to grow more than 70% by 2030.<sup>52</sup> To address such issues, Morocco has accepted the UN's 2030 Agenda, and in a

review of the readiness of Morocco to implement the UN's Sustainable Development Goals, the nation was found to show clear commitment and promise, with an agreeable constitutional and legislative framework to achieve these goals.

Morocco has several legal provisions in place to promote sustainability and environmental protection through construction impact assessments for new building projects as well as energy-efficient construction requirements applicable to most residential and commercial projects.<sup>53</sup> Several projects in the country have also achieved LEED green building credentials.<sup>54</sup>



*Tangerine Bay Housing by Malka Architecture*

Morocco's commitment to sustainable growth is further displayed in the several renewable energy projects that the nation is working on, such as the Noor Midelt Solar Plant, which is to be built by Morocco's Green Energy of Africa and U.A.E.'s Masdar,<sup>55</sup> and Tarfaya Wind Farm, one of the biggest wind farms in the continent.<sup>56</sup> In 2016, a program to give 600 mosques across Morocco a green revamp by fitting them with solar energy systems was also launched, with investments from the German government.<sup>57</sup>

Morocco is also home to Africa's first eco-city, Zenata, which is located northeast of the largest Moroccan city of Casablanca and spans 1,830 hectares.<sup>58</sup> During the UN's COP22 that took place in Morocco, the city of Zenata was awarded the Eco-City Label (ECL). The project is being funded by Morocco, with a USD 4.85 million grant from the European Union, and USD 181.9 million loans each from the French Development Agency and the European Investment Bank. Other high-value sustainable building projects in the region include the Sustainable City in Rabat (USD 2.5 billion), Mahdiyyah Renewable Energy City (USD 2.5 billion), and Rabat Bouregreg Tower (USD 375 million).<sup>59</sup>

According to Rand Merchant Bank's (RMB) 'Where to Invest in Africa 2020', Morocco has one of the most attractive markets for investment opportunities compared to other African countries,<sup>60</sup> due to its diversified economy, along with the urbanization and growing middle class.<sup>61</sup> Furthermore, in an attempt to strengthen Morocco's economic recovery amid the uncertain environment created by the COVID-19 pandemic, the EU and the European Bank for Reconstruction and Development (EBRD) are supporting green investments in the private sector.<sup>62</sup> The investments are made in two main programs, collectively worth USD 306.8 million: the Green Valley Chain Programme, focused on supporting SMEs' investments in energy and resource efficiency measures, and the Green Economy Financing Facility, which aims to provide up to USD 197.6 million to hundreds of private companies in order to support climate mitigation and the adoption of green technologies. These companies are likely to include agribusiness and construction firms, primary industrial sectors and manufacturing, and commercial and residential buildings, among others, showing major promise for the advancement of green building in Morocco.

# The Future of Green Building

Even though sustainability is the buzzword of the new millennia, awareness for practical sustainable actions is fairly low among many developers and investors. This is one of the main hurdles that is holding back the sustainable development movement in the construction industry. While Africa is planning on increasing its investments in the Power & Energy industry, increased awareness of the benefits of green buildings such as lower operational costs, increased ROI as well as an overall improvement in occupant health and wellbeing, is key to establishing greener cities.<sup>63</sup>

A large-scale shift to a greener construction industry cannot be achieved without strong governmental support. Governments of nations such as South Africa and Egypt have already started to make green building necessary — by setting zoning regulations and developing building codes that focus on long-term value, human safety, and energy efficiency. Green building is also made to be more viable through demand offset programs and tax-based bonuses. Other African countries should follow suit.<sup>64</sup>

Green building rating systems are an objective way to prove that buildings are indeed as sustainable as they claim to be. It serves as a benchmark against other buildings in the country. These systems are extremely useful guides that help the design and construction to cover all the aspects of sustainability. Most rating systems work on point systems which are broken down into categories. The project earns points for being compliant with credits available. It is audited and the points are accumulated to determine what rating (silver, gold, platinum etc.) the building will be awarded. These rating systems are more reliable as they require third-party verification, which makes the claim that a project is sustainable more credible.<sup>65</sup>

In Africa, there are a few rating systems that have been regionally adapted to suit specific needs such as Green Star South Africa and EDGE. Net Zero, LEED, and WELL are also some international certifications that are used. For example, 78 Corlette Drive is a contemporary office development in Johannesburg that is Net Zero<sup>66</sup> while EMEC headquarters in Egypt are LEED certified.<sup>67</sup> Ultimately, it's likely that these and other certifications will become more widely adopted as the industry develops and matures.



78 Corlette Drive. Image credit: Adam Letch

The number of green construction projects in Africa has been steadily growing and are influencing some trends in construction. Pre-existing structures are being retrofitted to be energy-saving, with lightweight construction and alternative building methods using creative solutions. While this is a more expensive route to undertake, we see more and more countries use old, classically designed buildings to convert into luxury hotels or penthouse apartments or convert industrial warehouses into affordable housing. Net Zero is another certification awarded to buildings that are growing in popularity. It presents no impact on the environment, water, waste, or energy.

The Vleihuis Development in Linden, Johannesburg is an innovative example.<sup>68</sup> Regenerative buildings are an extension of Net Zero such that the built environment is not only being planned, constructed, and operated to use less water and energy but generate it themselves. These self-reliant communities create a local ecosystem that can thrive off of filtering air and nearby water sources from pollution. Lastly we see that innovations in design and materials of exterior walls or nearby landscaping are used to control how air enters the building.

Taking advantage of natural ventilation based on wind conditions, sun shading and the green landscape outside are only some of the passive design elements that are used. These take the load off HVAC systems and allow for a comfortable and healthy environment. Choices of carpeting, paints, and furniture are also important as they are known to release toxins into the air inside and thus require natural ventilation.<sup>69</sup>



*Vleihuis Development. Image credit: Marc Sherratt*

## CONCLUSION

The Paris Climate Agreement has been pivotal in refocusing minds on the cost of climate change. Out of the 54 countries on the continent, 33 of them have signed up to the agreement and are working towards lowering their carbon emissions. Transitioning into a green economy is difficult because there still exist high start-up costs, poor regulatory systems, weak bankable schemes and ignorance among policymakers. Scientists have predicted that the risk to Africa's ecosystem would take off 3% of the continent's annual GDP by 2030.<sup>70</sup>

The UN Environment Programme has also predicted that the GDP in Kenya as a green economy would improve by 12% by 2030. This means that 3.1m of its citizens will no longer live in poverty and the agricultural sector will get a 15% boost.<sup>71</sup> In recent years, Africa's green industries have been an attractive proposition for international investors. According to the UN, the developing world needs up to 13 times more funding by 2030 if they are expected to make a significant change in the global green economy. This has led to an increased interest by local governments in foreign investments from China and the Middle East to develop the Power & Energy sector in Africa. We are also seeing the emergence of green bonds on the continent—traditional debt instruments that collect investments for green projects, in Nigeria (USD 63m) and Morocco (USD 115m) among other west African countries.<sup>72</sup>

To summarize, the green building sector offers plenty of advantages for African nations. Greener cities are healthier and a better long-term investment. In the same way, African cities offer major opportunities to the green building sector thanks to their rapid development and the continent's natural resources. With countries like South Africa and Egypt leading the way, the industry is bound to boom over the next decades.

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