



SITUATION BRIEF 1:

BUILDING CONSENSUS FOR NET ZERO CARBON (NZC) BUILDINGS IN SOUTH AFRICAN CITIES

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For **Sustainable Energy Africa**
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A. Key Points

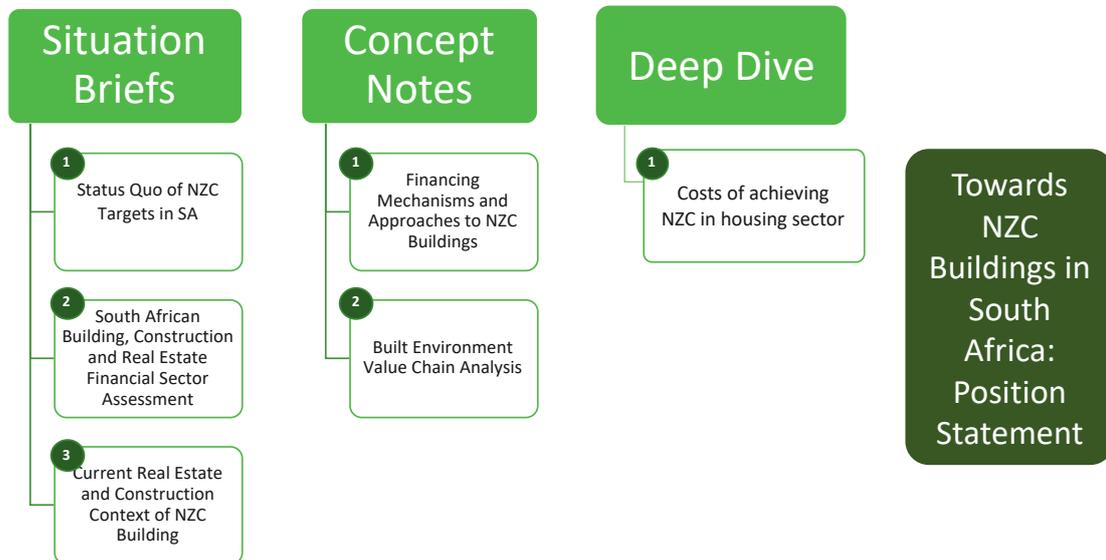
- As a signatory of the Kyoto Protocol and the subsequent Paris Agreement, South Africa is committed to meet ambitious carbon reduction targets that will reduce climate change. South Africa's built environment emits at least one third of the country's carbon emissions and must play its part in reducing carbon emissions.
- South Africa has made important strides towards a low-carbon development trajectory. This includes the Climate Change Bill, 2008 and the draft regulations for building energy monitoring and energy performance certificates.
- The World Green Building Council has initiated a "Towards Net Zero" programme to drive NZC building targets. This requires all new buildings to be NZC by 2030, and all buildings to be NZC by 2050.
- South Africa's four largest cities, Johannesburg, Tshwane, Cape Town and eThekweni signed a Global Net Zero Carbon Buildings Declaration of 2018, as part of a C40 South Africa Buildings Programme.
- South Africa has achieved notable successes with respect to planning for its future low-carbon transition and has implemented a number of programmes that aim to assist in moving the built environment to a lower-carbon trajectory. However, to date these have not had a significant impact on South Africa's move towards NZC buildings.
- Different sectors of the property market have diverse challenges and opportunities in respect of achieving NZC buildings. While all property sectors must be part of the NZC building transition, commercial; industrial; residential and sociocultural buildings have different constraints and opportunities in relation to a South African NZC building consensus.
- Significant gaps must be tackled if South Africa is to successfully move towards a low-carbon built environment. This includes the need for consolidated vision and leadership from the built environment, development of appropriate legislative and regulatory measures, and ensuring adequate financial, technical, research and capacity supports to assist with implementation.
- A clear plan of action is required for the built environment. A key component of this consensus will be generating synergy between property occupiers, owners, operators, developers and financiers in the public and private sectors.
- A five-stage plan of action is proposed to actively participate in the low-carbon future for the building sector: First, a unified call to action; Second, joint negotiation and agreement on the future trajectory for the built environment. Third, developing a realistic and implementable plan of action. Fourth, coordinated and well-resourced built environment knowledge and research agenda; and Fifth, defining a unified package of built environment incentives and supports.

B. Introduction

This project aims to build consensus for net zero carbon buildings in South African cities. Our overarching objective is achieving consensus regarding the economic and financial elements of the transition to net zero carbon buildings in South Africa. This will be achieved through four stakeholder dialogues, informed by a series

of three **Situation Briefs**, two **Concept Notes** and a **Deep Dive Analysis**. The final outcome is a **Position Statement** that sets the path **Towards Net Zero Carbon Buildings in South Africa**.

Figure 1: Developing a Position Statement on Net Zero Carbon Buildings in South Africa



This Situation Brief 1 outlines the Status Quo of achieving NZC Building Targets in South Africa. It considers the importance of NZC Buildings, the positions of international and local organisations and the progress made towards NZC Buildings in South Africa. Finally, it identifies key gaps that must be dealt with in order to develop consensus on the pathway towards NZC Buildings in South Africa.

C. Defining Net Zero Carbon Buildings

A Net Zero Carbon Building is a highly energy-efficient building with all remaining operational energy use from renewable energy, preferably on-site but also off-site production, to achieve net zero carbon emissions annually in operation. A highly **energy-efficient building** ensures minimal use of energy for heating, ventilation and air conditioning (HVAC) and other energy uses such as appliances through a combination of good design, deliberate choice of materials and technologies and smart operation. To be considered as Net Zero Carbon, buildings must use Carbon as their key metric, and each buildings' carbon balance must be transparently measured and disclosed. They must promote deep energy efficiency and establish a hierarchical preference for onsite Renewable Energy, then offsite Renewable Energy, and finally Energy Offsets. We note that this energy cascade is driven by the developed North, and may require deeper consideration given South Africa's unique developmental context and developing energy mix. Finally, NZC Building operators should continuously improve energy performance over time.

Many features of NZC Buildings are shared with Green Buildings but these are not necessarily the same. Green buildings ensure design, construction and operation of buildings that maximise quality of life and internal environmental quality of occupants or users; Consideration of environmental impacts and adaptability to a changing environment; Efficient use of energy, water and other resources; Use of renewable energy; Embracing reuse and recycling of materials; and Use of non-toxic, ethical and sustainable materials. Most of these features impact the energy efficiency and use of a building. Therefore, elements of green buildings are necessary but not exclusive requirements for NZC Buildings. South Africa's Cities make a strong case for considering both energy and general resource efficiency as integrally linked.

Figure 2: Features of Net Zero Carbon Buildings



Source: WGBC Advancing Net Zero. Taken from the Canadian Green building Council

All buildings can be NZC Buildings. Homes, offices, factories and community buildings can all be designed or modified to be NZC. However, **not all green buildings are – or need to be - the same.** Different countries and regions have characteristics such as distinctive climatic conditions, unique cultures and traditions, diverse building types and ages, or wide-ranging environmental, economic and social priorities that shape their approach to green building.

D. Importance of the Built Environment to Climate Targets in South Africa

South Africa contributes 1% of total global Greenhouse Gas (GHG) emissions, and 50% of Africa's emissions. While mining (36%) and Transport (26%) are the two major emitters of GHG, the buildings are responsible for over 30% of South Africa's total Greenhouse Gas (GHG) emissions. Improved end-user energy efficiency is recognised as the most important contributor to emissions reductions¹.

South Africa is a signatory to important international climate mitigation protocols². In 2003, South Africa signed the Kyoto Protocol which commits the country to reducing greenhouse gas emissions based on the assumption that global warming exists and that the major cause is man-made carbon-dioxide emissions. The Kyoto Protocol operationalises the United National Framework Convention on Climate Change, which commits South Africa to adopt policies and measures to mitigate greenhouse gas emissions, and to report periodically on its outcomes.

South Africa has legally binding international commitments to manage its carbon emissions that aim to hold increases in global temperature to below 1.5 degrees Celsius. In 2016, South Africa ratified the Paris

¹ Droz, F (N.D). SDC Energy Efficiency Building Sector Programme

² See: <https://climateactiontracker.org/countries/south-africa/pledges-and-targets/>

Agreement on climate change and has submitted its instrument of ratification to the United Nations³. This is a legally binding instrument that enables all ratified nations to act collectively to address climate change. Each country commits to make a fair contribution towards the global effort, within the context of ensuring sustainable development and efforts to eradicate poverty. Importantly, the Paris Agreement binds all economic sectors within a ratified country to these climate commitments.

South Africa's Low Emission Development Strategy 2050 (SA LEDS 2050)⁴ outlines the country's path to a low-carbon future, while at the same time ensuring broader socio-economic development goals are achieved. The LEDS 2050 builds on the 2004 National Climate Change Response Strategy⁵, and outlines how the major sectors of the economy will implement policies and measures to reduce emissions up to the 2050 target. This strategy focuses on low-carbon development, but also takes into account the combined impacts of climate adaptation measures. Importantly it identifies the need to drive co-benefits, which simultaneously further development goals such as the National Development Plan (NDP) and the Sustainable Development Goals and South Africa's climate response. The LEDS 2050 outlines how various economic sectors would implement low-emission development trajectories, but does not specifically deal with the plans for the contribution of the built environment to climate mitigation. Figure 3 below shows the potential relationships between NZC Buildings and the SDGs.

Figure 3: Relationship between Net Zero Carbon Buildings and the Sustainable Development Goals.



Source: World Green Building Council. Advancing Net Zero.

The final strategy for meeting South Africa's climate change commitments is not yet finalised, which presents an opportunity for inputs and engagement on the targets from the built environment sector. In September 2019, President Ramaphosa announced the government would finalise a 'Just Transition Plan', "including defining a vision compatible with the 1.5°C temperature goal". The President also confirmed South

³ https://www.environment.gov.za/mediarelease/southafrica_ratifies_parisagreement

⁴ Department of Environmental Affairs (2018). South Africa's Low Emission Development Strategy 2050. South Africa submitted its Low Emission Development Strategy (LEDS) 2050 to the UNFCCC in 2018.

⁵ Department of Environmental Affairs (2004). National Climate Change Response Strategy.

Africa will update its adaptation Nationally Determined Contribution (NDC) and enhance its mitigation strategy by 2020. This will include an allocation of carbon budgets and specification of Desired Emission Reduction Outcomes (DEROS)⁶.

The built environment is a major contributor to global climate change impact⁷. Buildings contribute a significant share of global GHG emissions from energy used for lighting, heating, cooling and the operation of appliances. In addition, the construction of buildings contributes further to GHG emissions⁸. Because the energy demands of operating buildings is so large, designing and constructing energy efficient buildings can lead to large and vital reductions in energy consumption. McKinsey (2017)⁹ estimates that global city action can contribute some 40% to global emissions reductions.

South Africa's four largest cities - Johannesburg, Tshwane, Cape Town and eThekweni - signed a *Global Net Zero Carbon Buildings Declaration* in 2018, as part of a C40 South Africa Buildings Programme. These four cities have developed energy and climate change strategies and are currently updating these to ***Climate Action Plans (CAP)*** within the global C40 movement. These CAPs aim to develop clear plans towards NZC emissions trajectories by 2050. Critically, the major influencing factors in these plans are the integrated strategies for electricity mix, the built environment and and transport strategies.

Residential and commercial buildings in South Africa generate over one third of South Africa's GHG emissions. SEA estimates that within South Africa's four major metros, 36% of energy-related GHG emissions are from residential (22%) and commercial (14%) buildings¹⁰. It is estimated that in 2015 buildings consumed over 30% of the country's total energy demand¹¹. The residential sector alone used 27% of South Africa's total energy demand, making it the second largest energy consumer in the economy¹². Commerce and public services demanded a further 4%. Further, a proportion of other sectoral demands (including Industry at 36%, transport at 27% and Agriculture at 2%) includes energy demand for residential, office and industrial buildings.

South Africa's built environment is already directly and indirectly impacted by the effects of climate change. South Africa has experienced and is projecting further impacts of temperature increases, rainfall variation and rising sea levels, as well as an increased frequency of severe weather events¹³. These include the devastating loss of property due to fire (such as the Knysna and Cape St Francis fires), increasing damage from floods and storm surge damage due to rising sea levels¹⁴ and increasing destruction to property caused by severe weather events. Furthermore, the potentially devastating economic impacts of 'Day Zero' on the property sector had Cape Town run out of potable water can only be surmised.

It is widely acknowledged that low-income households are exposed to the greatest impact from climate change. While NZC building initiatives have primarily focused on up-market office, retail and residential buildings to date, many South African households living in inadequate or basic housing face increasing impacts

⁶ http://tgh.co.za/case_studies/design-of-south-africas-climate-change-mitigation-system/

⁷ <https://www.eesi.org/topics/built-infrastructure/description>. For instance, it is estimated that buildings use about 40% of the USA's energy, a significant proportion of which is generated from coal and contributes directly to climate change emissions.

⁸ <https://www.eesi.org/topics/built-infrastructure/description>. It is estimated that the manufacture, transport, and assembly of building materials such as wood, concrete, and steel account for another [eight percent of energy use](#).

⁹ McKinsey (2017). Focused acceleration: A strategic approach to climate action in cities to 2030.

¹⁰ Cilliers, Z and Euston-Brown, M (2020). Aiming for Zero Carbon New Buildings in South African Metros.]

¹¹ This figure requires corroboration through modelling. This estimate comprises Residential (27%), Commerce and Public Services (50%# of 4%, of which 83% is electricity demand) and 5%# of the 36% for Industry That is: 27% + 2% + 1,8% = 30,8%.

¹² Department of Energy (2018). South African Energy Sector Report.

¹³ South Africa's Intended Nationally Determined Contribution (INDC).

¹⁴ <https://www.cbn.co.za/featured/rising-sea-levels-threaten-cape-towns-coasts/>

of climate change on a regular basis. These include wide temperature fluctuations, severe weather patterns (wind, rain and hail), threats to water resources and rapidly increasing tariffs for energy and water. Arguably, the benefits of NZC buildings could benefit lower-income households more than any other income group.

Low-income households can derive significant comfort, health and economic benefits from energy-efficient buildings. NZC Buildings are often associated with high-end offices and houses. However, low-income households have a high energy burden and can spend more than 10% of their income on energy for cooking, water and space heating and lighting, compared to middle and high-income households that spend 2% to 3% of their budget on energy on average. Low-income households are therefore disproportionately impacted by increases in energy costs, as well as by the impacts of poorly-insulated housing such as pre-2012 subsidised housing that did not consider passive design elements and do not have insulated ceilings. Because of high energy costs, many low-income households resort to limiting energy consumption, or using unclean and dangerous forms of energy such as coal and paraffin which have other negative health impacts.

E. What Has South Africa Achieved So Far?

Over the last decade, South Africa has undertaken key research and developed important frameworks, legislation and financial supports for a low carbon transition. Many of these are relevant to the built environment transition to a low carbon future. While these have achieved important outcomes and hold much promise, they have also not yet been implemented at a scale that will significantly influence emissions targets, and more support is required.

South Africa has a clear framework of policy and legislation to guide climate change mitigation. Since the release of the *National Climate Change Response Policy* in 2011, South Africa released its first *National Climate Change Report* in 2016, and released an update in 2017. The National Development Plan sets a target of zero emission building standards by 2030¹⁵. Chapter 5 (Transition to a Low Carbon Economy). South Africa's *National Climate Change Bill* is now at an advanced stage and is expected to be passed into law in the near future. The purpose of the Bill is to build an effective climate change response and ensure the long-term, just transition to a climate resilient and lower carbon economy and society. This will be done within the context of sustainable development for South Africa and will provide for all matters related to climate change.

The Post-2015 National Energy Efficiency Strategy (NEES)¹⁶ builds on the 2005¹⁷ NEES by stimulating deeper energy improvements through a combination of fiscal and financial incentives, legal and regulatory framework and other enabling measures. Its vision is to “*promote energy efficiency as the “first fuel” in driving balanced, socially inclusive and environmentally sustainable economic growth boosting job creation and leading technological innovation across the region.*” The NEES lists expected reductions in energy consumption between 2015 and 2030, including 29% for the economy overall, 15% for the industry sector, 37% for the public and commercial sectors. Key initiatives that form part of the NEE Action Plan are a public awareness campaign, municipal streetlighting programme, public buildings programme, solar water heating programme and an industrial energy efficiency programme. These are intended to be supported by policy, institutional arrangements, standards and regulatory mechanisms.

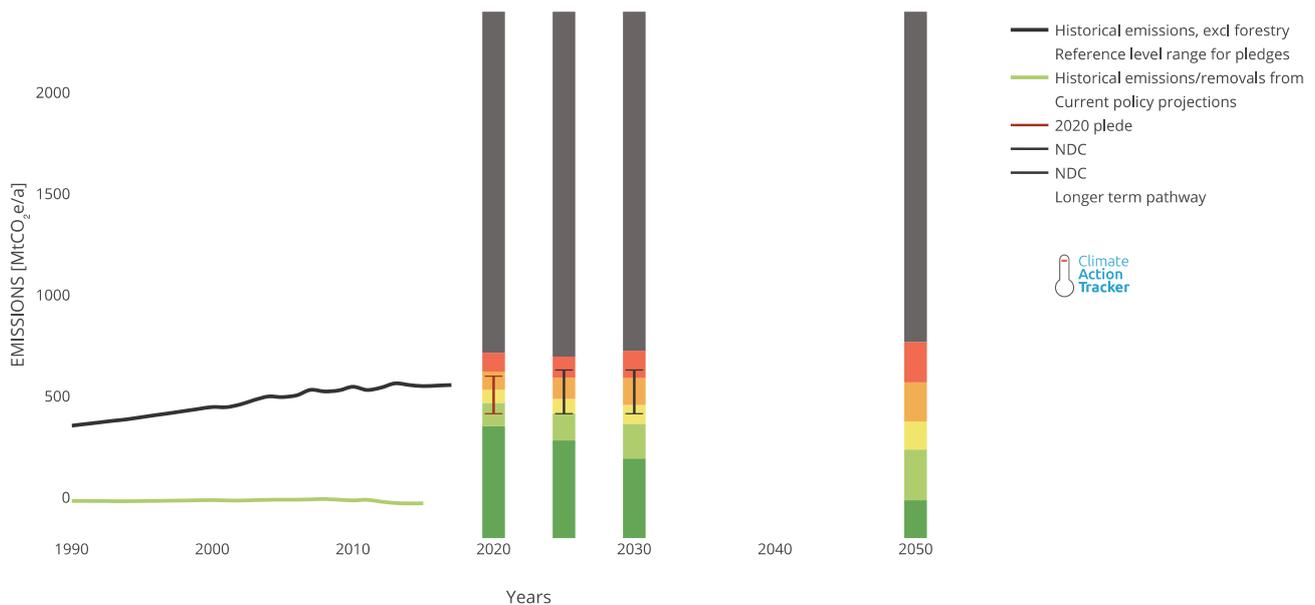
¹⁵ This is a Chapter 5 objective of the National Development Plan 2030.

¹⁶ Department of Energy (2013). Overview of the National Energy Efficiency Strategy (NEES) post 2015 and Department of Minerals and Energy (2009). National Energy Efficiency Strategy for South Africa (revised 2008). Government Gazette No. 32249.

¹⁷ Taking its cue from the White Paper on Energy Policy (1998), this consolidates various energy efficiency initiatives, including energy standards, appliance labelling and the implementation of an efficiency programme for national government-owned buildings. The NEES targeted a 12% improvement in energy efficiency between 2008 and 2015. This target was intended to be achieved using enabling instruments and interventions. These include *inter alia* economic and legislative means, efficiency labels and performance standards, energy management activities and energy audits. The intent was to promote adoption of longer-term efficient practices.

While South Africa's Nationally Determined Contributions (NDC) to climate mitigation South Africa are ambitious, they are considered inadequate to meet climate change requirements. South Africa approved its Integrated Resource Plan (IRP 2019) in October 2019 which confirms a change in power generation towards renewables and gas driven energy generation. Yet, The Climate Action Tracker¹⁸ rates South Africa's Nationally Determined Contribution (NDC) target as "Highly Insufficient" (illustrated in red on the bar charts), indicating it is on a path to contribute to a +3 to +4 degrees Celsius world. Figure 3 illustrates the emissions impact of the current policy projections.

Figure 4: South Africa's Climate Change Trajectory based on Nationally Determined Contributions (2019)



Source: <https://climateactiontracker.org/countries/south-africa/>

At a national level, the South African government has implemented a number of initiatives that encourage mitigation of the environmental impact of the built environment. The Department of Trade and Industry (DTI) has been driving green technology adoption in major industrial sectors through the provision of incentives and financial assistance. These include the *Capital Projects Feasibility Programme*, the *Critical Infrastructure Programme* and the *Manufacturing Competitiveness Enhancement Programme*. Further, the *Industrial Energy Efficiency Programme (IEE)* (2010 to 2015; 2016-2019) promoted and implemented energy management systems and energy optimisation in companies. Further, the *AFD Green Energy Fund* provides finance to small-scale renewable energy and energy efficiency projects, and manufacturing of green products. Eskom's *Integrated Demand Management Programme (IDMP)* provided several incentive-based mechanisms to achieve electricity demand reductions in the industrial, commercial and residential sectors. This includes replacement or installation of LED lighting, heat pumps, Solar Water Heating (SWH) and efficiency improvements to machinery and equipment. Currently this programme is under review.

South Africa's Income Tax Act provides a series of tax rebates that drive lower-carbon technologies that benefit the built environment. Section 12B allows companies to deduct, from their taxable income, the cost incurred from investing in assets that are used directly for the production of renewable energy. Section 12I offers support for both capital investment and training related to Greenfield (new) and Brownfield (expansions or upgrades) projects within South Africa's manufacturing sector. Qualifying projects are called "Industrial Policy Projects". Section 12K provides for tax exemptions on proceeds gained from the disposal of certified emission reductions derived from activities registered with the Clean Development Mechanism. The tax

¹⁸ See <https://climateactiontracker.org/countries/south-africa/>

window runs up to 31 December 2020, in line with termination of the second commitment period of the Kyoto Protocol. Section 12L is a tax incentive for the implementation of efficiency initiatives. Finally section 37B allows companies to deduct expenditure on environmental pollution control and monitoring equipment and/or disposal sites from their taxable revenues. Section 12L alone has delivered more than 24 TWh in energy savings since 2018¹⁹.

A Carbon Tax will be progressively implemented in South Africa from 2020. The promulgation of the *Carbon Tax Act (No. 15 of 2019)* effective from 1st June 2019 starts this process, with a three-stage phasing in approach: up to 2022; 2023-2030, and beyond 2031. The Act is based on the “Polluter Pays” principle through pricing carbon by internalising the external costs of carbon emissions. This includes an additional fuel tax, as well as taxes on all fuel combustion, activities, industrial process emissions and “fugitive” emissions. Further, the act includes Carbon Dioxide equivalents for a wide range of other GHG emissions. The property sector (1A4a: Commercial / Institutional and 1A4b: Residential is listed under Schedule 2, which provides its basic tax-free allowances for fossil fuel combustion allowances and other allowance thresholds.

F. Status Quo of NZC Buildings in South Africa

While South Africa has taken its cue for Net Zero Carbon Buildings from the developed world - and despite significant progress and some notable successes - there is a long road to achieving NZC building targets.

The World Green Building Council (WGBC) launched its Advancing Net Zero²⁰ project in 2017 that aims to ensure all new buildings are NZC by 2030, and that all buildings are NZC by 2050. The WGBC is working with Green Building Councils across the world – including the Green Building Council of South Africa - to develop tools, programmes and resources to promote the urgency and achievability of net zero carbon buildings, and to build industry capacity to deliver them. While the GBCSA has not directly adopted the Advancing Net Zero programme, it drives a number of green and NZC building initiatives in South Africa, taking a lead from the WGBC.

Few South African organisations have publicly committed to NZC Building declarations. Most notably, our four largest metros (Johannesburg, Tshwane, Cape Town and eThekweni) are signatories via C40 to the Global NZC Declaration. The Commitment to NZC Buildings requires an organisation to embrace the five actions: **Commit:** All buildings *within direct control* of the organisation to operate at net zero carbon by 2030, and all buildings by 2050. **Disclose:** Measure, disclose and assess annual asset and portfolio energy demand and carbon emissions. **Act:** Develop and implement a decarbonisation roadmap outlining key actions and milestones. **Verify:** Demonstrate enhanced energy performance, reduced carbon emissions and progress towards net zero carbon assets and portfolio. **Advocate:** Demonstrate leadership to support the wider transition towards net zero carbon buildings.

The Green Building Council of South Africa (GBCSA) aims to ensure that buildings and homes are designed, built and operated in an environmentally sustainable way and strives for an end goal of complete market transformation. GBCSA works in collaboration with its members to advocate for a built environment “in which people and planet thrive”. A series of solutions, tools and voluntary rating systems are available that enable the design, construction and operation of buildings in an environmentally sustainable, healthy and efficient way. This includes *Green Star Net Zero Rating Tools and Certifications*²¹ that can be applied to new

¹⁹ See <https://www.engineeringnews.co.za/article/sanedi-says-12l-tax-incentive-is-paying-off-2020-03-31>

²⁰ <https://www.worldgbc.org/advancing-net-zero>

²¹ <https://gbcса.org.za/certify/green-star-sa/net-zero/>

construction, retrofits and existing buildings already in use to achieve net zero ratings for carbon, water, waste and ecology. The GBCSA certified the first four buildings in South Africa under its **Net Zero Pilot Certification Scheme** in October 2017. GBCSA also offers the *Excellence in Design for Greater Efficiencies (EDGE)*²² software platform that sets a target of a 20% reduction in energy, water and embodied energy consumption.

South Africa's Climate Change Response Strategy (CCRS) sets out an Energy Efficiency and Energy Demand Management (EEEDM) Flagship Programme. The *Energy Efficiency Strategy (EES)* already targets a 15% reduction in energy intensity for public buildings. However, the EEEDM aims to assist to implement energy efficiency programmes in private, commercial and public buildings. To date, this has not been successfully implemented in provinces and municipalities. **The Energy Efficiency in Public Buildings and Infrastructure Programme (EEPBI)**²³ aims to catalyse energy efficiency transformation in South Africa's public sector buildings through supporting the implementation of the EEEDM. The EEPBI provides a comprehensive framework for promoting, identifying financing and implementing energy efficiency measures. This includes a project preparation facility, a technical support component and a NAMA support facility to mobilise public and private sector investments in public buildings at an intended 1:3.3 ratio²⁴. While there have been some notable public sector projects, such as the Department of Environmental Affairs' new offices in Tshwane, this programme is currently not being implemented at significant scale. The *Energy Efficiency Leadership Network (EELN)*²⁵ is a partnership of over 40 businesses, government departments and agencies and business associations with a focus on energy efficiency, strategy and policy implementation. The EELN has assisted with the implementation of the NEES amongst its members, who collectively consume over a quarter of South Africa's energy.

From a regulatory perspective, the energy efficiency elements of the National Building Regulations and Building Standards Act were updated in 2011. This included an initial chapter (X) on environmental sustainability that sets out the future approach to requirements for energy usage in buildings, in respect of the reduction of GHG emitted by buildings. Chapter X considers energy use efficiency in relation to vertical transport, thermal comfort, lighting and water heating; building envelopes and services that contribute to energy efficiency; the requirement for non-electricity resistance water heating; and the approach to satisfying these requirements using rational design or theoretical energy usage performance. The SANS 10400-XA national standard provides an approach for compliance with the minimum standards applicable to buildings. However, compliance with mandatory energy efficiency regulation SANS10400 XA is not universal and varies across cities. Recent studies have shown compliance is improving with time, with eThekweni and the City of Cape Town having steadily increasing compliance which is now estimated to be between 70% to 80%. Other cities' levels of compliance are however well below this despite implementation in 2011²⁶.

The Residential Sector Programme has pioneered movements towards greater energy efficiency for new accommodation across the residential sector, as well as retrospective actions to improve energy efficiency of existing residences. This has included forward-looking initiatives, including the updating of SANS

²² <https://gbcса.org.za/certify/edge/>. The EDGE tool is developed and updated by the International Finance Corporation.

²³ The Vertically Integrated Nationally Appropriate Mitigation Actions (V-NAMA) programme supports this programme. See <https://www.nama-facility.org/projects/south-africa-energy-efficiency-in-public-buildings-and-infrastructure-programme-eebpip/>

²⁴ <https://www.nama-facility.org/projects/south-africa-energy-efficiency-in-public-buildings-and-infrastructure-programme-eebpip/>

²⁵ <https://www.nbi.org.za/focus-areas/environmental-sustainability/energy/the-energy-efficiency-leadership-network/>

²⁶ Presentation by Lisa Reynolds to GBCSA in 2020

regulations in relation to energy efficiency. This in turn has been adopted by the National Housing Programme, which updated the specifications of subsidised housing to meet SANS requirements. South Africa's commercial building sector is an international leader in designing, building and managing green, low-energy buildings. Notwithstanding this, the scale of implementation of Green and NZC buildings in South Africa is well below the required levels to meet international targets. Significant potential still exists to improve both retrospective energy efficiencies in the housing sector, as well as the implementation of energy efficiency standards for residential buildings.

The Department of Energy's National Solar Water Heater Repair/Replace programme (SWHRR) programme provided a subsidy on the purchase price of installed SWHs. By 2016, 443 486 units of an envisaged total of one million units had been installed. The aim is to install an additional 4 million units by 2030. The programme has been handed to the Independent Power Producers (IPP) office, who after a review of the programme has commenced a pilot rollout in the Northern Cape. An additional programme driven by the private sector has also incentivised the replacement of failed electric geysers. Eskom is pursuing construction efficiency opportunities in order to unlock savings to fund 50 000 extra connections per annum.

The Energy Efficiency Monitoring and Implementation Project (2010 to 2015) assisted to pilot the introduction of a monitoring system to work towards national energy efficiency targets in the building sector²⁷. This was a joint project of the Department of Energy, SALGA and five pilot municipalities, with funding and guidance from the Swiss Cooperation Office.

The National Business Initiative is the local partner of the CDP Climate Change, who focuses investors, companies and cities on taking action to build a sustainable economy by understanding their environmental impact²⁸. CDP consolidates information on climate change risks, opportunities and integration from JSE100 companies, on behalf of 827 institutional investors representing over \$100 trillion in assets. This enables companies to integrate climate change strategies into their overall business strategies and governance. In its 2018 report it concluded that *"...the integration of climate change into governance is not producing the actions we need... Encouragingly monetary savings from emissions reduction activities were up significantly from R1.4 billion in 2017 to R3.1 billion in 2018."*²⁹

The C40 Cities initiative is a network of 96 of the world's megacities that are committed to addressing climate change. The C40 Cities Climate Leadership Group (C40) supports cities to collaborate, share knowledge and undertake clear actions on climate change. Four South African metros – Cape Town, eThekweni, Johannesburg and Tshwane – are C40 members and have committed to delivering on the goals of the Paris Agreement. These metros are developing and implementing ambitious programmes that aim for net zero carbon emissions from all buildings by 2050³⁰. The C40 programme aims to achieve building energy performance through policy, regulations and bylaws and to pilot energy efficiency in certain building types (such as office buildings) in order to create a path for city-wide implementation. A working group has been established and, working with the GBCSA and using the EDGE tool, aims to assist cities with assessing the transition requirements of existing buildings and energy efficiency markers for new buildings.

Sustainable Energy Africa (SEA) is the local partner that is assisting the four South African C40 member metros to develop and implement their NZC Buildings programmes. Each city benefits from a technical advisory officer embedded in their operation, and supported by a senior city line manager. Through this support, cities are empowered to develop and implement 'enabling milestones' through which internal

²⁷ Droz, F (20??) SDC Energy Efficiency Building Sector Programme. Swiss Agency for Development Cooperation.

²⁸ <https://www.cdp.net/en>

²⁹ National Business Initiative (2018) CDP South Africa Climate Change 2018 Executive Summary.

³⁰ Cilliers, Z and Euston-Brown, M (2020). Aiming for Zero Carbon New Buildings in South African Metros.

capacity is developed within technical and managerial levels. It is anticipated that the programme will catalyse local economic development and hope to ensure the ease of doing business in South African cities.

South Africa's four major cities have started the movement towards NZC Buildings, albeit that much more work will be required. The City of Cape Town plans to mainstream NZC Buildings using an updated Resource Efficiency Criteria for Development guideline, integrating low-carbon development conditions for new buildings and precincts and developing carbon neutral new-build requirements for its Transit Oriented Development catalytic sites. eThekweni hopes to incentivise green development that is highly resilient to climate impacts affecting Durban, such as flooding. The City of Johannesburg has a Built Environment Guideline, which will be simplified and reissued for wider distribution and awareness-raising. The City of Tshwane frames itself as the green capital of South Africa and requires that new city-owned buildings achieve a Green Star certification rating of five stars or higher. They plan to review their existing Green Building By-law to have a sharper / more clarified commitment to a zero carbon target³¹.

The Renewable Energy Independent Power Producer Programme (REIPPP) has commenced the transition of South Africa's coal-dominated energy production capacity to renewables. While there is a long way to go, this programme has assisted to resolve technical standards for grid-tying RE, has developed compatible tariff structures and has seen the approval of 102 IPPs that generate 6 400MW from bid windows 1 to 4 and the first small energy producer programme. Significant progress is still required to broaden and deepen IPPs in the energy mix, as well as to ensure ease of access and use of RE by consumers.

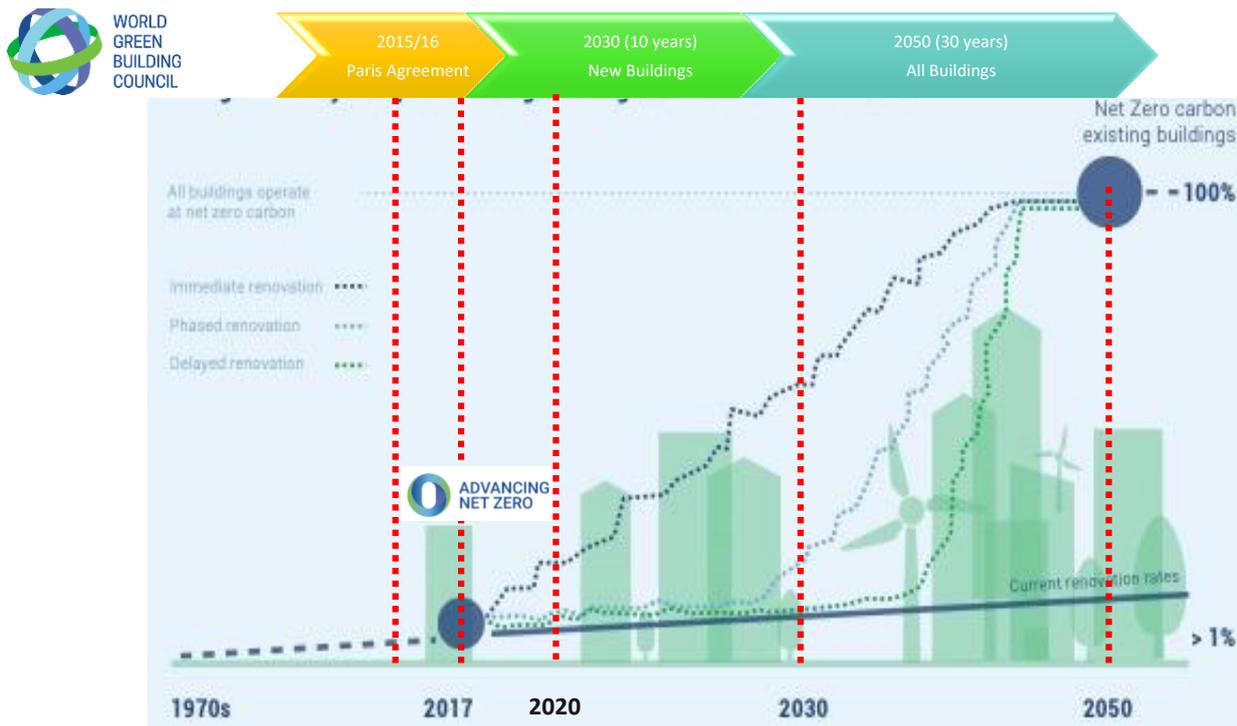
G. The Road to a Low Carbon Built Environment in South Africa: Where are the Gaps?

If South Africa is to commit to the WBGC's Advancing Net Zero timelines, we now have less than a decade left to meet the 2030 target of NZC for all new buildings, and three decades to meet the target of NZC for all buildings. South Africa's planning horizon towards NZC Buildings is set out in Figure 5 below. Notwithstanding the various initiatives outlined above, South Africa has a massive challenge ahead if it is to commit to and implement a low-carbon or NZC building sector within these timelines. It is clear that - in addition to a clear commitment from the building sectors - much greater planning, guidance and implementation assistance will be needed.

The legislative, policy and regulatory frameworks guiding lower-carbon buildings in South Africa need to be consolidated and detailed in a clear building sector-wide plan for a low-carbon future. As the built environment is not a separate recognised economic sector, its various sub-sectors must self-organise in order to ensure a fair, just and ambitious low-carbon future. This will need collaboration between stakeholders representing the public sector and private sector residential, commercial, industrial and retail stakeholders. **Without a co-ordinated framework for action, the built environment will continue to be the victim of imposed targets and requirements, rather than participants in their co-creation.**

³¹ This paragraph is taken from Cilliers, Z and Euston-Brown, M (2020). Aiming for Zero Carbon New Buildings in South African Metros.

Figure 5: The Road to Net Zero Carbon Buildings in South Africa



Source: Adapted from the World Green Building Council: *Advancing Net Zero*

Built environment regulators, users, professionals, developers, operators and financiers must play central roles in driving change in South Africa’s built environment. The massive scope of a lower-carbon future, both in respect of renovation and new developments, can only be achieved with clear synergy and foresight. Therefore, government at all levels, property industry and professional bodies, financial institutions, the scientific community and non-profit organisations must work together to develop and implement a workable strategy.

South Africa lacks a coherent, achievable and implementable plan regarding how a low-carbon trajectory for the built environment will be achieved. While the NDP calls for NZC Building legislation to be in place by 2030 and many climate mitigation commitments have been signed, there is not yet an agreed approach to how this can and will be achieved. There is also not yet a clear relationship between NZC Building programmes and South Africa’s development agenda as set out in the National Development Plan 2030 and articulated in the Sustainable Development Goals and Africa’s Agenda 2063. This becomes increasingly important in the aftermath of COVID-19, where most new investments will be judged on their ability to contribute to social and economic betterment.

The multiple and significant threats posed by climate change on the built environment must be integrally linked to how South Africa’s built environment is planned, designed, financed, delivered and managed. Urban planning and design professionals must be clearly tasked with furthering the NZC building agenda, as “... the task of interweaving the demands of climate change into South Africa’s settlement development policies is yet to be attempted in a focussed manner.”³² It is important to limit energy use in existing buildings, as well as to ensure new buildings are designed, built and managed more energy efficient manner. The commercial, public and residential building sectors continue to expand rapidly in South Africa. Further, the full life cycle of buildings must be understood when determining energy use. This includes their impact on the production of inputs, construction, productive use and end-of-life decommissioning.

³² Chrisna du Plessis, Daniel Irurah & R. J. Scholes (2010). The built environment and climate change in South Africa

South Africa must build a compelling scientific evidence base for the relative costs and benefits of NZC Buildings in different sectors. The residential building sector is a major user of energy in South Africa and can contribute significantly to energy efficiency improvements, but to do this a deeper understanding of the benefits and costs of NZC buildings is required. As indicated in the National Development Plan, *“Planning for the transition requires a foundation of trustworthy data and analysis, neither of which is reliably and transparently available in South Africa”*³³. An ambitious programme of research, development and innovation is required that relates climate change science and technology to the specifics of South Africa’s built environment sector.

The important influence that City and local governments have over urban planning, building design and energy use through the building plan approval process must be harnessed. While important progress has been made in certain metros, the process of driving NZC buildings will require significantly greater action and resources from local government.

H. Plan of Action: Towards a NZC Building Consensus in South Africa

The discussion above demonstrates the critical role that the built environment must play in South Africa’s trajectory towards a low-carbon future. Notwithstanding the many successes, South Africa’s built environment must now mobilise to determine its future contribution to mitigating climate change. To achieve this, a five-point plan of action is proposed that will guide the transition of South Africa’s built environment towards a Net Zero Carbon Future.

First, a Unified Call to Action. Concerted effort is needed to galvanize all built environment stakeholders towards meeting NZC Building targets in South Africa. Recognising the criticality of, and limited time frames available for fundamental sectoral change to a low-carbon future, representatives from the built environment are invited to contribute to the development of a position statement reflecting the potentials, possibilities and problems with a low-carbon strategy for the many different components of South Africa’s built environment. The development of a clear Built Environment Position Statement on the Transition to a Low Carbon Future that represents the views of key stakeholders will create a platform on which further actions can be based.

Second, Joint Negotiation and Agreement of our Future Destiny. It is imperative that key built environment stakeholders engage in the development of plans that will impact the built environment. The South African government recognises that any current and future climate change response requires a holistic consideration of the costs and benefits of such responses on the lives of ordinary South Africans. Essentially, this means that actions geared at reducing the country’s GHG emissions and combating climate change need to be conducted in a manner, which is just and sustainable for all citizens. South Africa’s resource mobilisation strategy is informed by the mainstreaming of climate change into the fiscal planning, budgetary process and decision-making across all sectors of society, including government, private sector and civil society.

Third, Developing a Realistic and Implementable (Strategic) Plan of Action. The transition of South Africa’s built environment to a low-carbon future will not be easy and involves risk to both private & public investors, resulting in potentially lower returns³⁴ and economic dislocation in the short term. It will require broad consensus and significant investment of time, knowledge and resources. The development of a comprehensive and realistic transition plan will be an important part of gaining trust and commitment to the outcomes. In addition, this plan must take cognisance of the devastating economic impacts of COVID-19 on society generally and the property sector in particular, and should consider ways in which such a transition plan could contribute to South Africa’s post-COVID Economic Recovery Plan.

³³ National Development Plan, Chapter 5 p187

³⁴ GBCSA (2019): *Green Building in South Africa: Guide to Costs and Trends*.

Fourth, a Clear and Well Resourced Built Environment Knowledge and Research Agenda. As a developing nation with a specific set of problems and opportunities, South Africa has much to gain from the move towards NZC Buildings. Evidence is growing that NZC Buildings will result in many environmental, economic and social benefits. In order to mainstream NZC Building approaches, a clear and scientific body of evidence is urgently required.

Fifth, Defining a Unified Package of Built Environment Incentives and Supports. While substantial financial resources have already been focused on climate mitigation in South Africa, the approach to climate change in the built environment has been ad-hoc. The National Climate Change Response Policy recognises that meeting climate goals will require a “...*massive and comprehensive mobilisation of financial, human and technical resources*” (LEDS). Based on an understanding of the cost of achieving NZC Buildings in South Africa, the property sector needs to mobilise around its potential to significantly impact on climate goals through the applied use of Climate Change resources for mitigation and adaption.