SITUATION BRIEF:

THE IMPACT OF NET ZERO CARBON BUILDING ON THE SA PROPERTY SECTOR

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For **Sustainable Energy Africa**

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A. Key Points

- Despite being modern and well capitalised, the formal property sector remains highly unequal and continues to grapple with several structural challenges.
- The Covid-19 pandemic has accelerated trends associated with the fourth industrial revolution, rapidly transforming the property landscape.
- Despite the challenges it brings, Covid-19 offers the opportunity of a "Great Reset", building a more inclusive and sustainable economy aligned with the aspirations set out in the National Development Plan 2030 and embodied in the infrastructure-led approach to economic recovery.
- Net Zero Carbon (NZC) buildings can be an integral part of this Reset, offering a compelling value proposition. NZC building benefits extend well beyond potential direct benefits to investors, supporting green growth as part of the just transition.
- Due to several challenges undermining the economic and financial case, the current uptake of green building – including NZC – remains limited**.**
- Overcoming these challenges is going to require changes to government policies, building standards, funding mechanisms, data collection and information dissemination.
- Ultimately, adoption of NZC building is possible, desirable and compatible with national policy and megatrends in the property sector.

B. Introduction

The threat of climate change requires a rethink of the ways in which urban areas are designed and delivered. Globally and locally, buildings contribute 40%of total emissions[1], primarily through their reliance on energy produced on site (Scope 1 emissions) or delivered by the electricity grid (Scope 2 emissions).

The C40 initiative, in which four South African metropolitan municipalities – City of Cape Town, eThekwini, City of Joburg and City of Tshwane – are members, sets **targets for all new buildings to be Net Zero Carbon (NZC) by 2030 and all existing buildings by 2050 as part of the C40 South Africa Buildings Programme**. The World Green Building Council defines a NZC building as 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.

[1] Global Alliance for Buildings and Construction, International Energy Agency and the United Nations Environment Programme (2019): *2019 global status report for buildings and construction: Towards a zero-emission, efficient and resilient buildings and construction sector*.

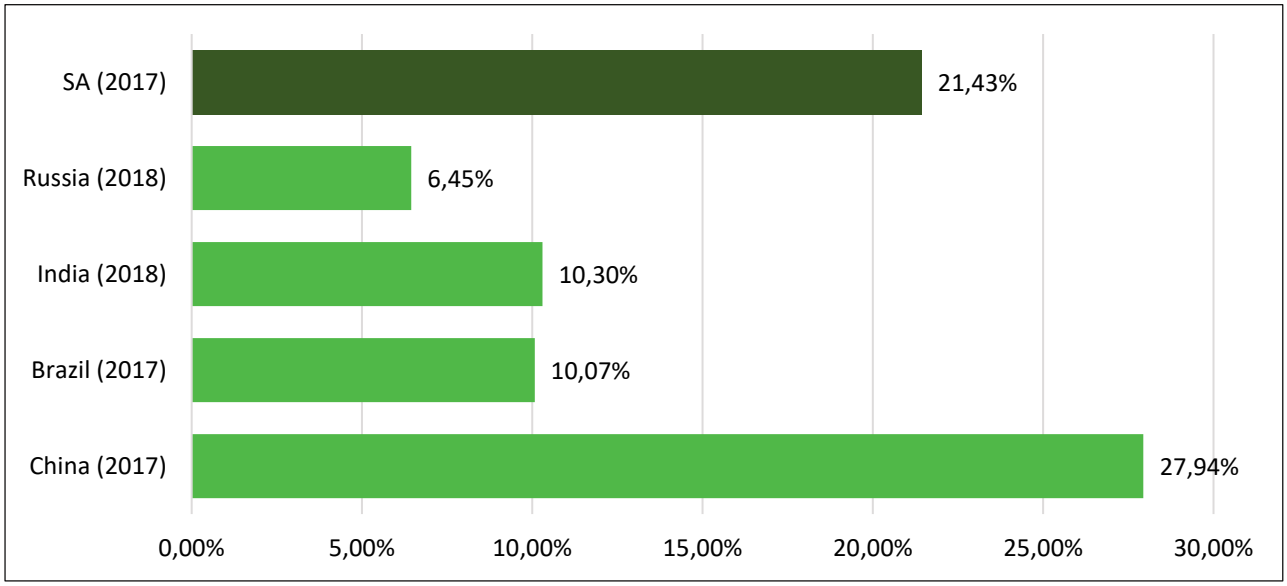
This situation brief explores the economic drivers and challenges to uptake of NZC within the South African property sector, focusing primarily on buildings developed for the market[2] (which constitute the majority). Hence, the business case for investors and lenders, integral stakeholders in this segment of the buildings sector, is explored to identify investment barriers to NZC. The brief outlines solutions and concludes with a call to action in a post-Covid-19 world.

This paper is part of a broader body of research undertaken by Sustainable Energy Africa in partnership with the C40 towards achieving NZC buildings in South Africa

C. Context

South Africa has diverse, modern and sophisticated property and financial sectors by emerging market standards. The Johannesburg Stock Exchange hosts diverse REITs (Real Estate Investment Trusts), while the banking sector - which supplies long-term mortgage finance to the REITs, other institutional investors including unlisted property funds, insurers and retirement funds, and households - is stable, sophisticated and well-capitalised. This is reflected in Figure 1, which shows ratio of housing mortgages to GDP is higher only in China, when comparing the BRICS countries.

Figure 1: Home mortgages outstanding at year-end relative to GDP (%)



Source: Hofinet database, Wharton School, University of Pennsylvania

Advanced property and financial sector development can be highly socially beneficial. Enabling access to home ownership through mortgages enables households to build equity over the long-term. Historically, South Africa has suffered a low savings rate, limiting individual access to capital with which to start up new businesses, invest in education, or provide for retirement (in the case of second homes). From a microeconomic perspective, homes are real assets which can be leveraged by personal investors at extremely competitive interest rates (relative to unsecured loans) to expand their investment portfolios. At a macro level, investment in the property sector drives demand for construction materials and services, as well as downstream demand for associated services (e.g. banking, property management). The construction sector employs 1.3m workers directly[3], with many more indirectly (i.e. elsewhere in the value chain) and induced (i.e. jobs created when direct and indirect workers spend their wages). Recent estimates suggest it generates

[2] This excludes subsidised buildings which are not developed for commercial purposes
[3] Statistics South Africa (2020): *Labour Force Survey: Quarter 1, 2020.*

approximately 6.3 jobs per R1m expenditure. This excludes site preparation, which generates 5.2 jobs per R1m expenditure. Real estate activities, being services associated with developing and managing properties, generate approximately 3.5 jobs per R1m expenditure[4].

Yet, for all these positive attributes, participation in the formal property sector remains highly unequal more than two decades after the end of Apartheid. A persistent housing backlog in cities across the country affecting low-income households and limited participation by Black businesses in the construction and property sectors undermine future stability.

Prior to the onset of the Covid-19 pandemic, **the local property sector has been grappling with structural challenges for several years**:

1. *Low/no economic growth*

An extended period of economic stagnation, starting in 2013[5], has resulted in an excess supply in the commercial property market. In Q1 2020, the national office vacancy rate was 11.6%, above the long-term average of 10%, with just two thirds of office buildings fully let[6]. Development activity had dropped to its lowest level since 1990, even before the impact of Covid-19 was felt.

In the residential sector, capital growth had slowed to below inflation over the past few years due to persistently weak macroeconomic conditions. Nonetheless, above-average growth had been achieved in the low value (below R300 000) and mid value (R300 000-R600 0000) segments, reflecting excess demand.

Table 1: Residential property price growth, 2016-2019

		2016	2017	2018	2019				2020				
					Q1	*Q2*	*Q3*	*Q4*	*Jan*	*Feb*	*Mar*	*Apr*	*May*
	National	4.7%	4.4%	3.0%	2.8 %	2.7%	2.7%	2.7%	2.7%	2.6%	2.5%	2.5%	2.4%
Area Value Bands	High Value	4.8%	4.1%	2.5%	2.2 %	2.3%	2.4 %	2.2%	2.1%	1.9%	1.8%	1.6%	1.4%
	Low Value	13.4%	10.2%	9.4%	9.6 %	10.1%	10.6%	10.6%	10.5%	10.4%	10.2%	9.9%	9.7%
	Luxury	4.6%	2.7%	1.4%	1.0 %	0.5%	0.0%	-0.5%	-0.7%	-0.8%	-0.9%	-1.0%	-1.1%
	Mid Value	4.3%	5.3%	4.7%	4.3 %	4.1%	4.2%	4.5%	4.7%	4.9%	5.1%	5.4%	5.6%

Source: Lightstone Property (2020): *Residential Property Indices, June 2020*

2. *Uncertainty over enforcement of private property rights*

In February 2018, Parliament passed a motion to review and amend the Constitutional provisions regarding expropriation without compensation. The subsequent policy debate has created uncertainty amongst private investors, both institutional and individual, regarding their ability to realise a return on their investment in property over the long term.

3. *Rapidly rising administered prices*

Over the past decade, the rate of inflation of electricity and water costs and other municipal services has exceeded general inflation, often significantly, making buildings more expensive to operate and occupy in real terms. At the same time, declining energy security has jeopardised building performance, in turn driving demand for the private provision of these services, for example through diesel generators and/or embedded generation solar photovoltaic (PV) systems.

[4] Schröder, E. and Storm, S., (2020). *Fiscal policy in South Africa: closed input-output income and employment multipliers*. Institute for Economic Justice, Research Note, No 1.
[5] At close to 80 months, this is the longest period of economic contraction in SA since the second World War.
[6] SAPOA (2020): *Office Vacancy Survey, Q1 2020*

4. Addressing the affordable housing backlog

Despite government provision of approximately 3 million subsidized homes, a housing backlog of millions persists. While Government reports that it continues to deliver 80-100 000 fully subsidized units annually[7], pressing fiscal and institutional constraints limit the potential for further rollout. The task of closing the gap thus does not lie exclusively within the public domain. Yet, within the private sector, delays in municipal planning processes and bulk service installations have increased holding costs and pushed house prices well beyond the reach of many. Even amongst those who can afford privately delivered stock, limited creditworthiness – associated with weak macroeconomic conditions – often pushes households into rental or other temporary arrangements, as they remain excluded from the mortgage market.

D. Impact of Covid-19 on the property sector

The spread of the Covid-19 pandemic has accelerated trends associated with the fourth industrial revolution: digitisation, remote and flexible working arrangements, and replacing traditional shopping with e-commerce. These are rapidly transforming the property landscape.

Overall, growth in the property sector is expected to slow significantly, impacting the construction industry and its supply base:

- A steep drop in demand for traditional office and retail space is anticipated, resulting from remote working arrangements, lower profitability, and business closure;
- A significant slowdown in new building activity, as attention turns to optimising or repurposing existing assets;
- Weak demand for construction materials and labour, which may negatively impact local industry and employment. This will disproportionately affect lower income earners, being unskilled and semi-skilled workers undertaking manual work (e.g. bricklaying).

Nonetheless, within this shifting landscape, **opportunities exist to create more integrated, climate-resilient cities**:

- Some existing vacant office and/or retail space may be converted into other building uses over the medium term as patterns of demand shift. For example, warehousing and logistics facilities may expand, possibly absorbing space in retail centres on the urban periphery. Further, falling office and hospitality property prices offer the possibility of conversion to residential stock, addressing the housing backlog;
- Adoption of cost reduction initiatives will increase, including utility efficiency and self-provision, as property investors reduce their exposure to external factors driving volatility;
- Investors will increasingly rely upon building technologies to facilitate remote working and boost building efficiency as the economy recovers. Smart buildings will optimize resource use and amenity, enabled by intelligent software and the rollout of fibre-optic infrastructure;
- A greater focus on health, wellness and environmental sustainability is anticipated as awareness of health and climate change risk rises.

While no part of the economy will be spared, the impact of Covid-19 is expected to be unequal. Some segments of the property market may prove more resilient than others.

At the time of the outbreak, sectional title residential and industrial property were notable growth pockets. The sectional title residential market is increasingly varied, catering for the full spectrum of households, from

[7] Republic of South Africa (2020): *Budget 2020*

entry level developments targeting student and affordable housing segments to lifestyle estates offering more affluent households a range of amenities. Within industrial property, especially warehousing and logistics facilities had been expanding to reflect the evolving structure of the retail sector.

Table 2: Buildings delivered by the private sector by year of completion, as reported by larger municipalities

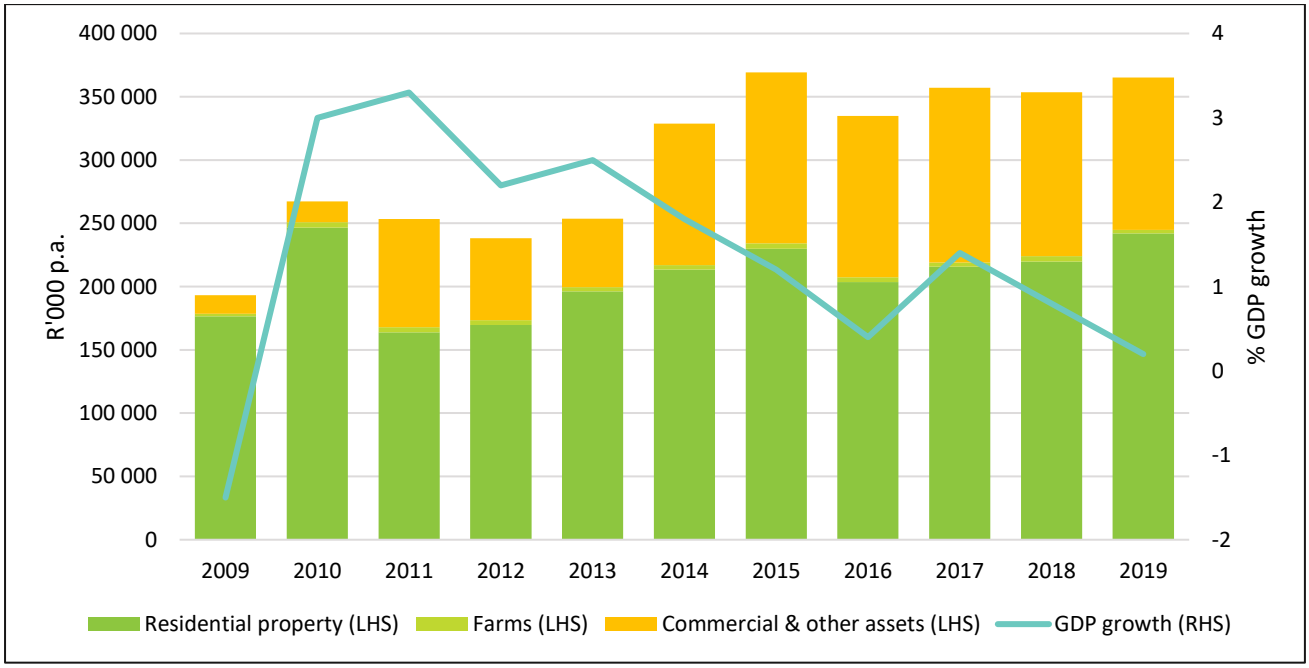
Property type	Share of GFA (% total)	Change in GFA Share (% points)	GFA added (m^2)	Units added (No)
	2019	2000-2019	2015-2019	2015-2019
Dwelling-houses < 80 square metres	5%	-17%	3 336 789	67 236
Dwelling-houses >= 80 square metres	27%	-6%	14 413 448	55 908
Flats and townhouses	36%	24%	10 143 873	82 610
Other residential buildings	1%	-1%	547 025	N/A
Office and banking space	6%	-3%	2 947 018	N/A
Shopping space	6%	-2%	2 974 597	N/A
Industrial and warehouse space	14%	4%	5 737 447	N/A
Other non-residential buildings	4%	0%	1 383 772	N/A

Notes: GFA is an acronym for Gross Floor Area, also referred as Gross Building Area, which refers to the total floor area within the building envelope, including the external walls.
Fully subsidized housing is not included in these figures
Smaller municipalities, which account for approximately 20% building stock, are not included in these figures

Source: Statistics South Africa (2020*): Selected building statistics of the private sector as reported by local government institutions, April 2020*

Whether the growth momentum in these sectors is maintained depends in large part on access to capital, specifically debt. During the previous recession, associated with the global financial crisis, access to finance for residential property proved resilient in comparison with commercial property, as Figure 2 shows.

Figure 2: New mortgages and re-advances over the economic cycle, 2009-2019



Source: South African Reserve Bank (2020): *Quarterly Bulletin, June 2020*

Structurally, the demand for housing is expected to remain robust. Yet, the extent and duration of the negative impacts of the economic contraction on end user affordability and creditworthiness are not yet known. Results from the NID-CRAM survey suggests that 3 million jobs have been lost, which – if sustained – would have a profound impact on household ability to acquire and service debt including mortgages, despite historically low interest rates. This may drive consumers down market and tend to favour rental over ownership.

Covid-19 offers the opportunity of a "Great Reset", building a more inclusive and sustainable economy aligned with the aspirations set out in the National Development Plan 2030. Low interest rates and possibly lower development input costs (land, materials and labour) create an opportunity to expand stock targeted at the lower end of the market, subject to a compelling business case. Similarly, unoccupied commercial buildings in centrally located areas offer opportunity for conversion to residential apartments or sharing units. These trends create the possibility of adding rungs to the housing ladder, reaching previously unserved groups earning R5-15 000 a month. Similarly, underutilized large office space can be converted into coworking or other flexible space to accommodate SMEs.

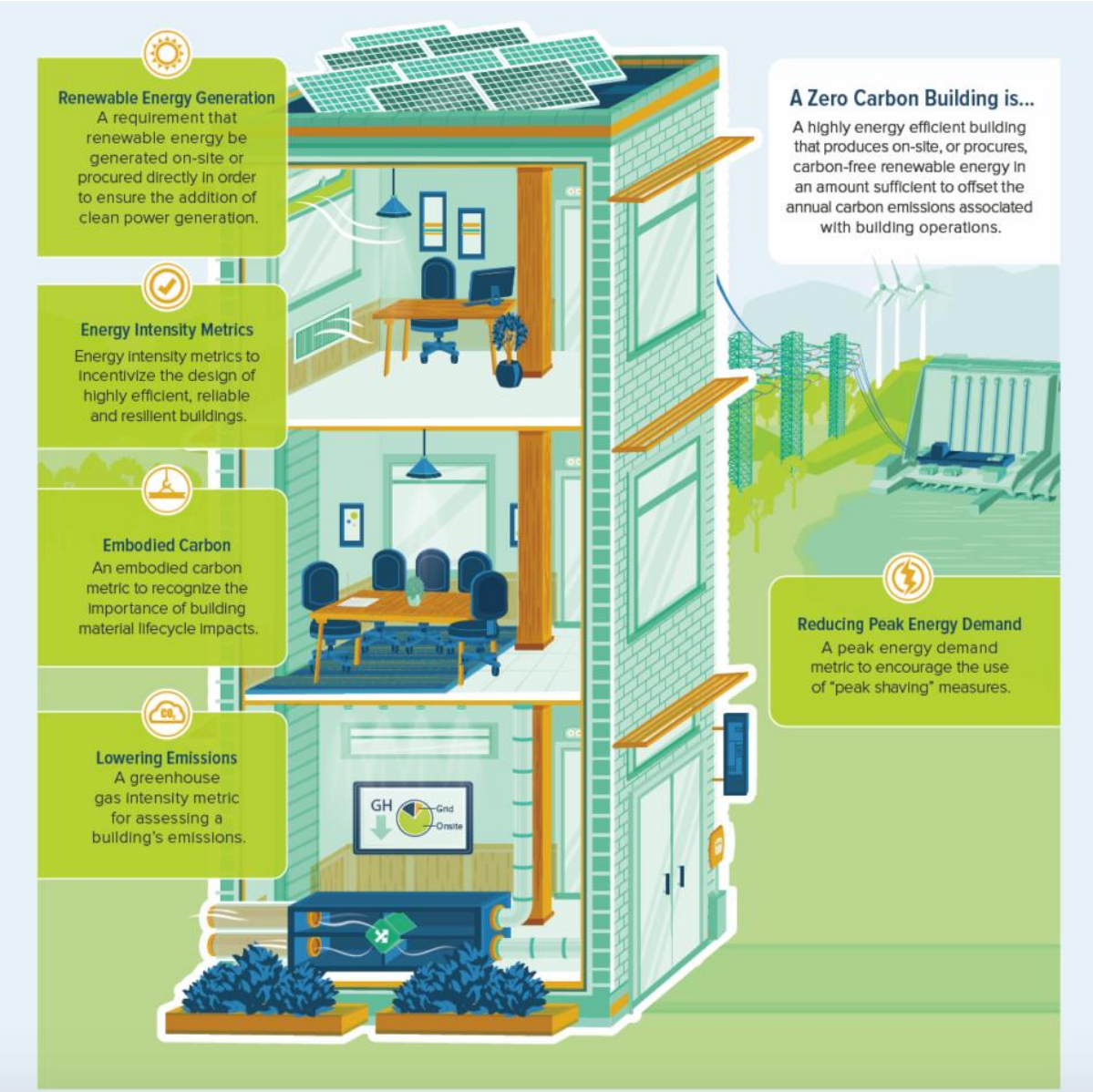
E. Net Zero Carbon as a strategic response

Looking into the future, customers across all property segments will demand more functionality and amenity across all price-points in what can be described as a "buyer's market". This may include uninterrupted service, modern technology to connect occupants with the world and optimised building performance, as well as comfort, health and safety. Property investors will need to find ways to simultaneously optimize the performance and operating cost profiles of their buildings to meet these expectations, making targeted investments.

NZC buildings address many of these requirements, as the features highlighted by Figure 3 show. On-site provision of renewable energy offers the possibility of uninterrupted access to electricity supply if the system is integrated with storage technology. Building management systems which facilitate the collection of performance data required to prove annual operational zero carbon can also optimize building performance, maintaining better thermal control and reducing inefficiencies in electricity consumption. Addressing embodied carbon often results in choices of building material with superior thermoregulation qualities, keeping occupants more comfortable in all seasons.

NZC buildings can help investors safeguard and possibly expand investments in the wake of the pandemic, offering a compelling value proposition including lower running costs and less exposure to future fluctuations in Eskom pricing and continuity of supply. In the commercial sector, green buildings often achieve lower vacancy rates as a result, retaining high quality clients even during challenging macroeconomic conditions. Going NZC also futureproofs property investments against longer-term regulatory threats posed by the carbon tax and energy performance certification requirements.

Figure 3: Key components of zero carbon buildings



Source: World Green Building Council

NZC building benefits extend well beyond potential direct benefits to investors. This range of benefits is considered in the broader concept of economic feasibility, which considers the externalities associated with an investment.

Policy level - housing: Crucially, NZC building provides a truly sustainable blueprint for expanding the affordable housing market to meet the needs of SA's population, particularly if it incorporates water efficiency. The World GBC has argued that all buildings must be net zero carbon by 2050 if global warming is to be limited in line with the Paris Agreement. Building additional stock that does not conform to these requirements is inconsistent with longer term climate policy objectives, implying a need for retrofit later.

Policy level - Industry: The green technologies installed in NZC buildings provide a local economic development opportunity: as NZC adoption rates increase, the business case for local green manufacturing improves, further accelerating adoption through falling costs and establishment of a local supply base. Job creation is spurred, directly – during construction – and indirectly – upstream through manufacturing, and downstream through

maintenance. The Department of Trade, Industry and Competition is currently drafting a Renewable Energy Masterplan with other key stakeholders, to culminate in a social compact centred on industrialisation and empowerment. Similarly, Government's broader economic recovery and reconstruction plan – currently being developed – is expected to focus on renewable energy as part of an infrastructure-led growth vision.

Site level: NZC structures can reduce the energy infrastructure investment requirement to municipalities and the utility that supplies them, but only if they deliver flatter load profiles. This relates both to electricity distribution and generation. The size of electrical connection required is lower if the load on site is reduced. Similarly, the need for peaking power to supply customers during periods of high demand may be less. The production of peaking power through gas turbines or diesel generators is enormously expensive as well as being environmentally detrimental. Both capital savings opportunities are valuable considering the financial constraints faced by local government and Eskom.

However, it is acknowledged that some of these benefits to municipalities may be offset through new requirements, for example making changes to accommodate the bi-directional grid flow and intermittency of renewable energy supply. As battery technology evolves and becomes more affordable, on-site storage and supply smoothing should improve, lowering the infrastructure costs borne by municipalities. In the interim, the shift towards increasing recovery of fixed grid distribution costs will assist. Similarly, time-of-use tariffs can externalize the additional costs of purchasing peaking power during periods when renewable energy sources are unable to supply demand, encouraging uptake of storage technology and/or enhanced load smoothing.

F. Challenges to NZC transformation

Today, uptake of green buildings – including NZC buildings – remains limited, in both commercial and residential property sectors. Even compliance with mandatory energy efficiency regulation SANS10400 XA, remains limited, despite implementation in 2011[8].

The root cause can be traced to the decisions made by property investors and lenders, which ultimately determine the demand for buildings with various attributes, and hence the demand for goods and services produced by upstream industries, namely manufacturing and construction. This group includes not only institutional investors and banks, but also homeowners.

The major hurdle to uptake is the negative impact on property developer or investor financial feasibility. Research undertaken by the GBCSA[9] has shown that the capital expenditure premium for green office buildings in South Africa was 3.9% over the past decade[10]. While exceptions exist[11], to date this additional expenditure has not been rewarded consistently by higher property valuations for either commercial or residential property. Therefore, mortgage lenders are unwilling to absorb the extra expense through larger loans, increasing the equity capital requirement. Unless equity investors are reasonably certain that they can earn a market-related return on the additional capital, the investment will likely not take place. Considering that the local market for green buildings is nascent, and the operating profit impact often uncertain, this is seldom the case. Ultimately, factors which reduce NZC project-level financial feasibility – i.e. the risk-adjusted return to investors - will result in projects not going ahead. Due to market failures – including the inability of private investors to capture value embedded in positive externalities – business as usual prevails.

[8] Presentation by Lisa Reynolds to GBCSA in 2020

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

[10] The study includes all South African office buildings certified by the GBCSA which are 4, 5 or 6 Star Green Star certified buildings, have either "Design" and/or "As Built" ratings, and applied the Green Star Office v1/v1.1 rating tool. The baseline specification is an office building compliant with SANS 10400 XA.

[11] Typically P-grade commercial buildings in premium nodes, built to advanced specifications including green elements

The alternative to achieving NZC through incorporating the additional measures in the property capital budget is to **contract with a third party to provide on-site use of clean energy equipment aimed at achieving the same NZC outcome**. In the energy efficiency space, these companies are typically known as Energy Service Companies (ESCos). Their business model is often built on shared savings: retrofitting existing buildings and deriving income to pay for the upgrade from sharing in the savings with the building owner. In the renewable energy sector, solar photovoltaic (PV) project developers have started selling units of clean energy via Power Purchase Agreements linked to captive energy systems on commercial and industrial sites. The latter – despite being relatively new – has more successfully attracting commercial finance than the former, due to difficulties in establishing energy savings and banking on these (instead of revenue), amongst others.

While the third-party ownership model holds promise, it is unlikely to fully solve the NZC challenge. Firstly, it is best suited to technologies which can generate a predictable revenue stream, such as renewable energy systems. Secondly, ESCo savings-driven models are most relevant for existing buildings with old technology: it would be far more difficult to establish an energy performance baseline for a building yet to be built. Thirdly, some energy efficiency features are not separable from the building structure (e.g. passive design, insulation), hence wholly unsuitable to third party ownership.

Adoption of NZC building is possible, desirable and compatible with national policy and property sector trends. In addition to mitigating climate change, it provides a route to immediately improving building performance while protecting investors against long-term regulatory risk. Increased demand for green technologies can stimulate the local manufacturing sector, creating jobs throughout the value chain.

G. Addressing the challenges to NZC transformation

To overcome the barriers to NZC, various changes need to take place:

1. **Policy and regulation – at both national and local spheres – should better align the incentives of private investors with society at large**, allowing private investors to share in value created by positive externalities and penalizing them for negative externalities.

2. **Catalytic funding should be introduced to facilitate uptake of NZC building** through rebalancing risk-adjusted return to investors and so removing disincentives to investment. Funding mechanisms will be explored further in this research series in a concept note.

3. **Unified, market-friendly, NZC standards should be developed/agreed for all segments of the property market.** Where possible, access to the certification tools should be open to the public, with minimal cost and burden attached to certification. Experience suggests that these factors, whilst relatively small in context, often prevent certification. The subsequent lack of certification hinders identification of green buildings, impeding price discovery for specific green building types.

4. **Rigorous data on the costs and benefits, both private and public, should be collected** as NZC building stock expands. The impact on private costs and benefits is most critical to quantify, since it directly impacts the financial feasibility of future projects and so the sustainability of the industry.

5. **NZC building awareness should be raised, knowledge shared (including analysis of data on costs of benefits), and stakeholders engaged** across the property sector. Policymakers, property valuers, property developers, investors and lenders are all critical participants in the development of this new approach to urban development.