

## Green commercial property development in urban South Africa: emerging trends, emerging geographies

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**Abstract.** Within sub-Saharan Africa South Africa is one of the leaders in greening and initiatives for sustainable urban development. Notwithstanding the central role of climate change impacts and of the green challenge for the future, the greening of urban development has not been a major focus in local geographical research. The task in this paper is to investigate one aspect of reorienting the economy towards a pathway of low carbon growth and of addressing the green urban challenge. Specifically, issues around the greening of commercial property developments in South Africa are explored. Under the ratings of the Green Building Council of South Africa 50 green buildings existed by early 2014. Geographically these properties cluster in South Africa's major cities, in particular Johannesburg, the country's economic powerhouse and centre for corporate headquarters, and Pretoria, the administrative capital. New proposals for building retrofitting may result in a greater spatial spread of green buildings in the near future.

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## 1. Introduction

In several recent benchmark contributions to African urban scholarship it is made evident that the effects of climate change are increasingly impacting upon life and livelihoods in Africa's cities (Parnell, Pieterse, 2014; Grant, 2015). Indeed, among the multiple challenges concerning the rapid pace of African urbanization is the future need to address what Freire (2013) styles as the “green” challenge. This challenge is described as to avoid increasing levels of per capita carbon emissions alongside a higher tempo of urban growth (Freire, 2013: 3). Across rapidly urbanizing sub-Saharan Africa it is apparent the issue of “how to conduct ‘climate compatible development’ within urban systems has become more pressing” (Taylor, Peter, 2014: 2). Within sub-Saharan Africa South Africa is one of the policy leaders in respect of greening and of initiatives for sustainable urban development. Debates around the greening of the economy increasingly are on the policy agenda of national governments as well as of metropolitan authorities. At the national scale the greening of the economy is a significant policy issue because of the high level of national unemployment and of the high carbon impact of the economy (Borel-Saladin, Turok, 2013a, 2013b). Among others the works by Montmasson-Clair (2012), Kaggwa et al. (2013) and Borel-Saladin and Turok (2013a) highlight that the trajectory of current economic growth in South Africa is strongly resource- and energy-intensive which aggravates pressures on the environment and accelerates the threat of climate change.

The imperative for advancing greening initiatives for the economy is made clear in national economic development planning. The New Growth Path (established in 2009) stresses the necessity to integrate green considerations into economic growth planning by decreasing the carbon emission of economic activities as well as actively identifying new opportunities in the green economy (Nattrass, 2011). During 2011 a significant step was the launch of the Green Economy Accord as a response to climate change concerns in South Africa as well as part of national response to global financial crisis (Montmasson-Claire, 2012). Driven by the national Department of Economic Development this is a “green

*partnership: to create jobs, provide a spur for industrialisation, and help to create a sustainable future”* (Department of Economic Development 2011: 3). On current planning projections it is calculated that the expansion of the green economy could galvanize 300,000 employment opportunities in South Africa over the next decade (Borel-Saladin, Turok, 2013a; Rogerson, 2014). In order to catalyse a transition towards a green economy the South African government has instituted the Green Fund which provides funding to support project initiation, policy and research, and capacity building activities around the green challenge (Mohammed et al., 2014). For urban governments across South Africa, struggling with limited rates of job creation from the formal economy, there are compelling attractions of planning for the green economy as a new potential lever for local economic development programming (Rogerson, 2014).

Notwithstanding the central role of climate change impacts and of the green challenge for future South African urban development it is evident the greening of urban development so far has not been a major focus for geographical research. From the findings of recent overviews about the ‘state of the art’ of urban scholarship and research it is apparent issues around greening have not occupied a significant place on the agenda of South African urban scholars as a whole and of geographers in particular (Visser, 2013; Visser, Rogerson, 2014; Rogerson et al., 2014). The most notable exceptions are recent research investigations around how South African cities are starting to evolve plans to adapt to the impacts of climate change (eg. Pasquini et al., 2014; Ziervogel, Parnell, 2014), strengthening the climate resilience of the country's cities (Taylor, Peter, 2014), and the first forays into how the private property sector is responding to greening the economy (Rogerson, Sims, 2012; Greenberg, Rogerson, 2014). Against this background it is the objective in this paper to examine one dimension of reorienting the economy towards a pathway of low carbon growth and correspondingly of addressing the green urban challenge in South Africa. In particular, the question of the greening of commercial property developments in South Africa is explored here. Two further sections of material are presented. First, key issues relating to the international movement towards the building of green property de-

velopments are discussed. Second, attention turns to the South African situation. The paper draws upon a range of sources including key stakeholder interviews, property industry reports and in particular the outputs of the Green Building Council of South Africa. The analysis looks at the institutional context for green property development, the growth and emerging geography of green property in South Africa and of progress made in the greening of commercial property. Overall this paper offers a modest contribution to debates around the need for the green growth of Africa's cities (see Freire, 2013) as well as expanding the limited existing literature in a developing world context about green property developments as a whole (see eg. Salehudin, 2012; Kamarudin et al., 2013)

## 2. Green Property – international trends and debates

In an important scholarly contribution Eichholtz et al. (2010: 1) highlight that “attention to ‘green’ has greatly increased over the past decade”. The international experience, which is documented across a range of studies in North America, Europe and Australia, is of a growing trend towards the greening of commercial property developments. This trend is manifest across all sectors of property including offices, institutions, industrial and hotel properties. In the global North the growth of green building developments is under scrutiny in many research investigations (Shiers, 2000; Pizam, 2009; Eichholtz et al., 2010; Wiley et al., 2010; et al., 2011; Bond, 2011; Attuyer et al., 2012; Chegut et al., 2014). It is revealed, for example, that in the case of London's burgeoning commercial property stock, the expansion of green buildings has exerted an economically significant impact on the city's commercial real estate market (Chegut et al., 2014). The financialization of green commercial real estate has been investigated also in the context of urban France by Attuyer et al. (2012). In the USA it is disclosed that building green is not a trend or idealistic pursuit but the ‘new reality’ of property development, maintenance and investment. This is confirmed by the fact that the number of building owners applying for green building certification from the U.S. Green

Building Council's Leadership in Energy and Environmental Design (LEED) programme has grown exponentially over the past ten years (Cidell, 2012).

The World Green Building Council is a network of national green building councils operating in more than 90 countries. Since its establishment in 1999 the World Green Building Council has been working to promote green building actions in order to address climate change and climate mitigation (Eichholtz et al., 2010). This organisation supports new and emerging Green Building Councils by providing them with the tools and strategies to establish strong organizations and leadership positions in their countries. The emergence and growth of voluntary certification systems such as Energy Star and LEED in the United States signals a paradigm shift towards increased environmental awareness in the commercial real estate industry (Reichardt et al., 2012). By building cost efficient and energy saving green buildings it is contended that alongside energy savings “green building has the potential to generate 2.5 million jobs” (Sah et al., 2013: 170). Across the global North there is growing concern for the environment and social reporting which causes more responsible investment in property developments which are styled as green properties (Eichholtz et al., 2010). The World Green Building Trends report confirms that the green building movement “has shifted from “push” to “pull” with markets increasingly demanding no less than green buildings” (McGraw Hill Construction, 2013: 1). It is considered that the growth of green building is not limited to one geographic region and instead is a trend spread throughout the global construction market place (McGraw Hill Construction, 2013). This said, across the global North in particular, green building is accelerating as it becomes viewed as a long-term business opportunity.

The rise of certification programmes has accompanied and stimulated the trend towards the greening of property development. The LEED designation was developed by the US Green Building Council as a way to encourage the adoption of sustainable building practices. LEED takes a whole building approach to green design and construction by focusing on five areas of human and environmental well-being rather than solely on energy conservation. These include sustainable site development, water savings, energy efficiency, materials selec-

tion and indoor environmental quality. The points awarded in different categories result in four levels of achievement, viz., certified, silver, gold and platinum. It is estimated energy costs typically account for 30% of operating costs of commercial buildings. In terms of green buildings with the Energy Star label these use nearly 40% less energy than average buildings. Energy Star is a joint programme of the US Environmental Protection Agency (EPA) and the US Department of Energy which aims at promoting energy-efficient products to reduce green star emissions. The Energy Star ratings are developed to empirically quantify energy usage for each property type. The main requirement involves tracking a building's energy performance and making the results available to the EPA. The Energy Star programme measures a building's relative performance using a lagged benchmark with a score of 75 or better out of 100 (Sah et al., 2013).

The Green Building Council of Australia was established in 2002 and since the launch of its Green Star rating system in 2003 buildings have been independently certified for their sustainable design and construction using Green Star rating tools (GBCA, 2013a). The green star rating tools help the property industry to reduce the environmental impact of buildings, improve occupant health and productivity, and achieve cost savings while showcasing innovation in sustainable building practices. This rating tool is available for offices, public buildings, schools and universities, hospitals, apartment buildings retrofits and industrial facilities. Between 2003 and 2012 over 500 buildings achieved Green Star certification (GBCA, 2013b). An analysis of these buildings reveals that they produce 62% fewer greenhouse gas emissions, use 60% less electricity, and 51% less potable water than average buildings. In addition, the rated buildings recycle 96% of their construction and demolition waste. Since 2003 more than 8 million square metres of building area have been Green Star certified (GBCA, 2013b). The Australian Green Star rating tool awards a minimum rating of four stars for best practice, five stars for national excellence and six stars for world leadership. The key feature of these new buildings is that they embrace technologies which make them more efficient (de Francesco, Levy, 2008). Management strategies relating to properties are also affected by sustainability initiatives as a number of proper-

ty companies in Australia incorporate schemes into their management strategies such as the 'green lease' where tenants conform to sustainability principles (de Francesco, Levy, 2008).

Studies of the performance of green buildings have increased as researchers have attempted to determine the benefits accruing to users of green space and the owners of these buildings. A number of studies have found evidence of higher rents and lower vacancies for green buildings (Miller et al., 2008; Eichholtz et al., 2010; Fuerst et al., 2010; Wiley et al., 2010; Fuerst, McAllister, 2011). Undertaking an analysis of a United States property database consisting of 2.8 million buildings (both certified and non-certified buildings), Reichardt et al. (2012) show that rentals increase by 2.5% with an Energy Star label and by 2.9% with a LEED certification. In London Chegut et al. (2014) demonstrate that there exists a measurable premium for developers and investors on taking green buildings to the commercial market. Eichholtz et al. (2010) analysed the economics of green buildings and concluded that despite increases in the supply of green buildings and the volatility in property markets brought on by the recession, these factors had not significantly affected the relative returns to green buildings in the USA. In addition, it was shown that, as compared to non-green certified buildings, the premiums in rent and asset values were substantial. Certain researchers have found evidence that sales premiums of as much as 10% can be realized by LEED certified buildings (Sah et al., 2013). Further research conducted by Kok and Jennen (2012) studying energy efficient and green buildings in the Netherlands confirmed the findings from the United States research that there is a rental premium and lower vacancies in green and energy efficient buildings even during recessionary times. The growing international consensus about the positive financial and environmental consequences of green building is as follows:

The decision to build green is routinely examined as an incremental series of expected cash flows. Development of a green building implies higher construction costs early in the project. With income-producing properties, the investor considers whether these costs will be offset by higher rents, improved occupancy, or savings in operating expenses associated with an energy efficient building. At the end of the holding period, the property is

expected to sell at a premium based on higher expected future cash flows. The difficulty with this approach is that very little market information exists on the premiums associated with green design (Wiley et al., 2010: 228).

As a consequence of the positive economic performance of green buildings many Real Estate Investment Trusts (REITs) that own income-producing real estate and are traded in the capital market have started to build a 'green portfolio' as these exhibit higher returns on assets than their less green counterparts (Sah et al., 2013). Nevertheless, Eichholtz et al. (2012) state that whilst there is a growing body of evidence related to the financial performance of green star rated commercial property, little is known about the implications of investments in green buildings for property companies. These authors investigate the effects of the energy efficiency and sustainability of commercial properties on the performance of a sample of US REITs and conclude that the benefits of green property investment outweigh the costs. This conclusion has implications for US REITs as only 2% of building stock within them are LEED accredited and only 6% Energy Star accredited. Overall, it was revealed that "portfolio greenness is positively related to operating performance and negatively related to risk" (Eichholtz et al., 2012: 27). These developments provide a positive outlook for the return on equity and assets of REIT investors as green buildings provide investors with a higher net income as well as higher valuations and sales prices.

Accompanying the expansion in demand for leasing space in green rated buildings there has been the growth of the green lease. This is designed to encourage the building owner and the tenants to adopt and maintain environmentally friendly, sustainable business practices in order to reduce energy and water use, recycle and create a healthy and comfortable environment for building occupants (Oberle, Sloboda, 2010). The benefit for the owner is to attract and retain quality tenants who are willing to pay a rental premium for space. The benefits for tenants are that they experience lower utility costs, improved health and productivity and also send a message of social and corporate responsibility to their investors or customers by leasing green space (Oberle, Sloboda, 2010). Kaplow (2009:134) asserts that "green building is gathering force" and

that in the 'not too distant future' green building will be the norm rather than the exception. Accordingly, there is a need to modify commercial leases to suit green star graded buildings. It was considered that in terms of property developments that a green lease "is an art in its infancy" (Kaplow, 2009: 135). This said, it must be understood that whilst the green lease is advocated for and training is provided by many of the international green building councils for its implementation, other research shows that it can be used by landlords as a 'hard green lease' to discipline and restrict tenants behavior in order that they adjust their operations in order to enhance energy efficiency in buildings (Attuyer et al., 2012)

### **3. Green Property in South Africa – emerging trends, emerging geographies**

#### **3.1. Institutional context**

Green commercial property developments are a recent phenomenon in South Africa. At the heart of the green building movement in South Africa are the operations of the Green Building Council of South Africa (GBCSA) which is an affiliate of the World Green Building Council. The business model of GBCSA closely follows that of the Green Building Council of Australia. It is a 'not-for-profit' independent membership-based organization and is located in Cape Town. The GBCSA was formed in 2007 with the goal of leading the transformation of the commercial property sector by ensuring that "all buildings are designed, built and operated in an environmentally responsible way" (GBCSA, 2013a: 2). The main objectives of the GBCSA are three-fold. First, is to promote and facilitate green building by promoting the practice of green building in the commercial property industry. Second is to enable the measurement of green building practices by developing and operating a green building rating system and third, is to improve the knowledge and skills base of green building in the industry by offering training and education and facilitating the implementation of green building practice by acting as a resource centre (GBCSA, 2013b: 5).

The 'Green Star SA' rating was created to establish a standard of measurement for green buildings to promote integrated, whole-building design and to identify building life-cycle impacts. Although there are several rating systems, including LEED from the United States, BREEAM from the United Kingdom and Green Star from Australia, the Green Star SA rating is based on the Australian system and has been customized for the South African context (GBCSA 2013a). Green Star SA evaluates the environmental initiatives of projects based on ten environmental impact categories. These are: management, energy efficiency, water efficiency, indoor environment quality, transport, material selection, land use and ecology, emissions and innovation (GBCSA, 2012). A further socio-economic category is planned to be added in the near future and this would be linked to broader sustainability issues through credits for employment creation, economic opportunity, skills development and training, community benefit, empowerment, safety and health, and mixed income housing (Du Toit, 2014). In addition to rating office buildings the GBCSA also rates retail centres, warehouses, multi-unit residential buildings, public and education buildings. It should be noted, however, that the activities of GBCSA and its ratings currently do not extend to the hotel sector. Rogerson and Sims (2012) have demonstrated that a number of green certification programmes, most importantly The Heritage Environmental Rating Programme for the Tourism and Hospitality Sector (which is partnered by the Green Globe international brand) are applied to rate the greening of hotels in South Africa. Additional rating tools are planned by GBCSA to incorporate a rating for existing buildings and for interior fit-outs as new buildings only account for 2% of the building stock whilst the remaining 98% is existing buildings (GBCSA, 2012: 22). The Existing Building Performance tool will make it possible for owners of existing buildings to obtain a Green Star SA rating through retrofitting their property. The Green Star SA Interiors rating tool for tenants assesses the environmental attributes of interior fit-out projects across a wide range of sectors. This tool will "reward high-performance tenant spaces that are healthy, productive places to work; are less costly to operate and maintain; and have a reduced environmental footprint" (GBCSA, 2013b). One new collaboration between

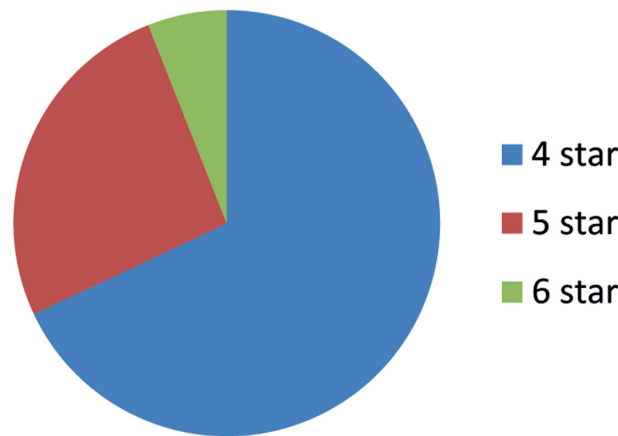
the Green Building Council of South Africa and Investment Property Databank (IPD), an international property benchmarking service, will analyse the fundamental investment benefits of efficiently managed buildings. The research will be based on environmental resource usage data submitted by local property companies and the performance of efficient buildings measured against IPD data, which represents a large portion of the South African commercial property sector (GBCSA, 2014). IPD have conducted a pilot study of 461 buildings owned by nine property funds where they measured the most efficient buildings and compared their property fundamentals. The top buildings outperformed the rest of the sample on every metric, including lower vacancy rates, higher rentals and higher net income growth. They consumed around one-third less electricity and half the amount of water which enabled businesses to operate with lower costs. It is observed that the energy efficient properties were on average two years older than the balance of the sample which highlights the importance of retrofitting and other sustainability initiatives (Barttram, 2014). When the sustainability index is rolled out in 2015 it will compare green certified new-builds and retrofits to the rest of the sample (1600 buildings in total). It is expected that this large sample of reliable data coupled with the greater level of transparency will encourage more property owners and investors to green their properties in order to realize savings as well as to ensure that they are not left with buildings that have no tenant demand and thereby leaving them functionally obsolete. Further initiatives in the pipeline from GBCSA include the announcement in September 2014 of the introduction of first green certification system for the residential sector in South Africa.

### 3.2. Trends and geographies

The greening of commercial property is a phenomenon only of the past five years in South Africa. In 2009 there was only one green star rated building in the country. By 2010 there were four green buildings, eight by 2011 and nearly doubling to 15 green buildings in 2012. In 2013 22 additional buildings were rated as green star bringing the national total by January 2014 to 50 buildings that are certified

with green star ratings. Taken together these building accounted for nearly one million square metres (GBCSA, 2013a). Of the total of 50 rated green buildings 42 properties are private sector owned by banks, property funds and individual corporate as head offices. The eight remaining properties

are a range of government owned properties both by national and metropolitan tiers of government. The government buildings notably include the head office of national Department of Environmental Affairs, the National Roads Agency and two buildings by the municipality of Cape Town.



**Fig. 1.** Green Star Projects in South Africa, 2013 by star category (n=50)

Source: Author

As is shown on Figure 1 the majority of green star rated commercial buildings in South Africa are 4 star rated which is best practice. A five star rating is considered as South African excellence and a six star rating is world leadership. At present the majority of Green Star rated buildings in South Africa are corporate head offices with single high profile tenants. The three six star buildings are two corporate head offices and one government department. It is argued that property funds are beginning to realize that “green building will soon become the norm” as green buildings make good financial sense (GBCSA, 2013a: 16). Growthpoint,

the largest property fund in South Africa, contends that in green buildings clients lease space at lower operating costs while promoting an environment that increases employee productivity. As landlords they can drive and standardize the latest sustainability processes resulting in a much larger positive impact on the environment and with an opportunity to deliver superior returns to their shareholders (Du Toit, 2014). Photos 1 and 2 show examples respectively of green buildings which are rated as four star and six star. The six star represents a corporate head office whilst the four star is a public building.



**Photo 1.** A four star rated government building

*Source:* South African Green Building Council



**Photo 2.** A six star rated corporate head office building in Johannesburg

*Source:* South African Green Building Council



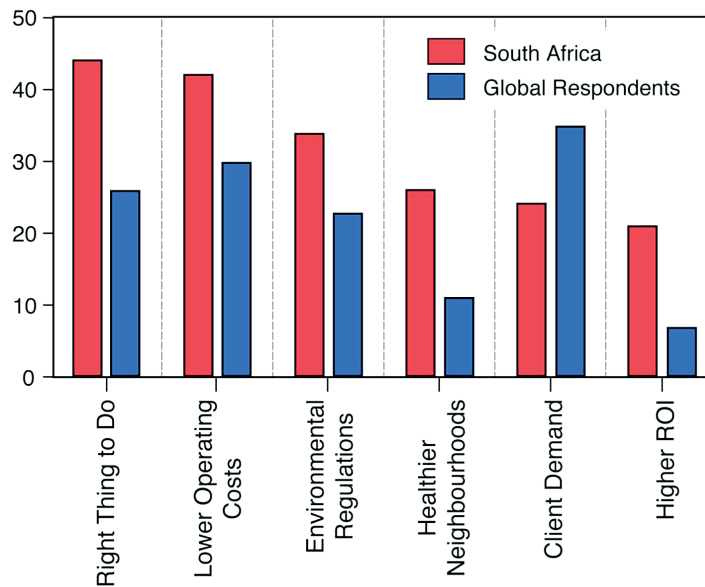


Fig 2. The Main Incentive for Building Green

Source: McGraw Hill, 2013

Figure 2 presents the findings of a recent investigation on the motives for ‘going green’ in terms of commercial property development. It is shown there are notable differences between drivers of green building activity in South Africa as compared to other parts of the world. In South Africa ‘the right thing to do’ is the main incentive for green activity and measured at 44% compared to 26% across the other global respondents. This suggests that the ethical reasons for building green are

stronger than the business case. Such a finding is in line with global trends as this is the same pattern that was reported by developed nations in 2008 when they were at an earlier phase in their greening journey as compared to present day South Africa (McGraw Hill, 2013: 35). It should be noted, however, that the ‘ethical’ reason to build green in South Africa is followed closely by the resultant lower operating costs that can be realized with green construction.

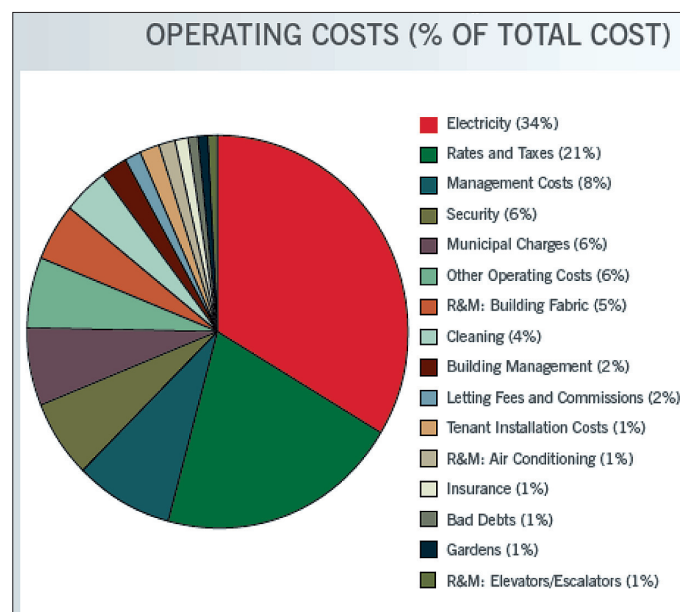


Fig. 3. An average breakdown of operating costs on a South African non green star rated building.

Source: SAPOA, 2013

2012 vs 2011	RETAIL	OFFICE	INDUSTRIAL
Total Costs (R/m <sup>2</sup> /month)	▲ 11%	▲ 13%	▲ 185
Total Costs (% total income)	▼ -1.4pp	▲ 1.6pp	▲ 1.1pp
Total Three Costs (% total cost)	Electricity (33%) Rates and Taxes (20%) Management Costs (8%)	Electricity (32%) Rates and Taxes (19%) Management Costs (9%)	Electricity (38%) Rates and Taxes (22%) Management Costs (9%)

Fig. 4. The highest three operating costs for different categories of commercial property.

Source: SAPOA, 2013

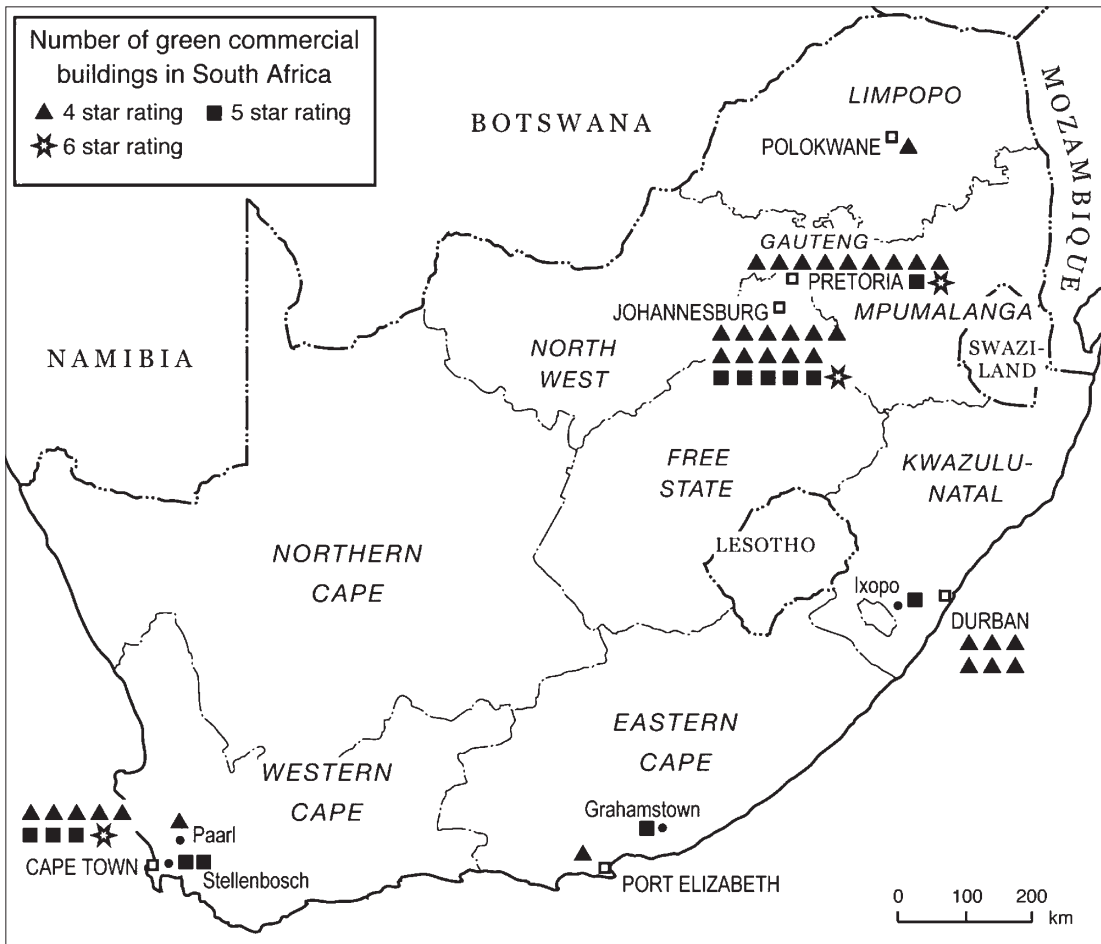


Fig. 5. The Spatial Distribution of Green Star Rated Buildings in South Africa

Source: Author

Figure 3 and 4 show operating costs of different forms of property. They point to a strengthened economic case for going green in commercial properties in South Africa. It is evident that electricity represents the highest operating cost totaling a third or more of all operating costs dependent on the type of building with offices at 32%, retail at 33%, and electricity in industrial buildings at 38% of operating costs. The other operating costs, name-

ly rates and taxes and management costs are difficult to control, however, electricity costs can be substantially reduced by implementing green initiatives. A range of green technologies have been introduced to South African green star rated buildings and include solar panels on the roof, LED (light emitting diode) lighting throughout, green planted roofs to insulate the building, monitoring systems that accurately measure electricity usage,

motion sensors to turn off lights, heat pumps that circulate warm water through the building to heat the building, and using cooling sea water to cool buildings in coastal locations.

Currently, it is disclosed that South Africa lags behind other parts of the world in terms of clients demanding green buildings (Fig. 5) which is a key driver for the design and construction of green buildings in other parts of the world. Overall, there are many benefits to the landlord in owning a green building, however, such benefits are linked to the behavior of tenants. Correspondingly there are benefits to tenants in occupying a green building albeit these benefits rely on systems provided by the landlord. Neither the landlord nor the tenant can realize the benefits from either owning or occupying a green building if they do not understand and act for the shared benefit. In order to properly manage a green rated building therefore many landlords have instituted a green lease. In South Africa this is a 'soft' green lease which is an addendum to a regular lease where both parties agree to provide and use the green technology in such a way that everyone benefits. The landlord gains a rental premium, reduced vacancy rates and improved sales value. The tenant gains a notable reduction in energy and water costs as well as higher productivity in a healthier building such as reduced sick leave and reduced staff turn-over. The owner also gains reputational spin offs in terms of corporate reporting and marketing as well as future proofing the building against any future legislation. The green lease is far more common in the global North than in South Africa and is also a more sophisticated and accountable legal document.

**Table 1.** Certified green star buildings by province

Province	Square Metres	Percent
Gauteng	666,110	78.4
Western Cape	142,960	16.8
KwaZulu-Natal	28,000	3.3
Eastern Cape	10,030	1.2
Limpopo	2,070	0.3

Source: GBCSA, 2013a

The geography of (rated) commercial green buildings in South Africa is shown on Fig. 5. Table 1 shows the total building area of the certified

green star buildings on a provincial basis. Overall what is revealed is the overwhelming dominance of green buildings in the richer provinces and most prosperous metropolitan areas of South Africa. At the provincial scale the massive dominance of green buildings in Gauteng, South Africa's economic heartland and major locus for head offices and government administration is observed. Together Gauteng and the Western Cape account for 95% of existing green building stock in the country as indexed by building area. Of South Africa's nine provinces green buildings are present in only five of the nine. In four of the country's poorest provinces namely, Northern Cape, Free State, North West and Mpumalanga, there are no green star rated buildings.

At the individual locality level Figure 5 highlights the metropolitan dominance of green buildings. The largest individual clusters are in Johannesburg, South Africa's corporate capital with 17 buildings, Pretoria, the administrative capital with 11 buildings. Next in importance are the coastal centres of Cape Town with nine green buildings and Durban with six buildings. These four cities account for 86% of existing certified green buildings in the country. The predominance of green buildings in these centres is clearly linked to the geography of headquarter offices and to the spatial distribution of major government activity. In the case of Johannesburg the green buildings are mainly for banks and corporate head offices which have recently developed new headquarters to a high green specification of five and six star grading. The country's administrative capital Pretoria is home to a number of private sector corporate head offices and office parks as well as some government departments such as Environmental Affairs and the national roads agency. In the Western Cape centres of Cape Town and neighbouring Stellenbosch green buildings are predominantly corporate head offices. The two Eastern Cape green star buildings are both educational buildings with one an English literature museum and the other a business school. The single green building in Limpopo province is the regional head office of an international consulting company. At the intra-urban level it should be noted that in the leading cities the premier commercial nodes attract green building developments.

In future it can be anticipated that there will occur a greater geographical spread of green buildings in South Africa beyond the small number of clusters that currently exist. It was revealed that Growthpoint Properties have approached the GBCSA to assess their whole portfolio with a view to retrofitting all of their buildings to green standards (du Toit, 2014). Such initiatives will increase the footprint of South Africa's green buildings beyond the current confines of high specification space in premier locations. Instead it will expand the number of green commercial properties into what are currently the more marginal parts of major cities as well as into secondary cities (du Toit, 2014).

#### 4. Conclusion

Critical observers of African cities are increasingly highlighting the challenges posed by the impacts of climate change (Freire, 2013). Taylor and Peter (2014: 3) draw attention to African cities as "vulnerable to a variety of climate change impacts". In addition, Grant (2015: 280) identifies as a central challenge "how to deal with existing and ongoing urbanization in conjunction with future climate related issues". Of major significance is extended planning "for new infrastructure, taking climate change adaptation and mitigation into account while retrofitting existing infrastructure to make it more climate resilient" (Grant, 2015: 280). Arguably, one aspect of adaptation to climate change and the building of climate compatible urban development relates to the need for the greening of economic development.

The property sector is one vital stakeholder in the greening of infrastructure in Africa's cities. This article focused only on the segment of commercial property development and upon the experience of South Africa. Considerable policy shifts are taking place in South Africa towards acknowledging the significance of greening and correspondingly of the planning and implementation of measures for a greener economy. Within the South African property sector this movement towards greening is of recent origin. It has been shown that under the certification ratings of the Green Building Council of South Africa a total of 50 green commercial proper-

ty developments existed by early 2014. The majority of these buildings currently are for private sector owners, many of them prestige headquarter offices for leading banks, finance corporations or industrial enterprises. The geography of these properties shows an uneven pattern of development with clustering in the country's most prosperous regions and the most prosperous cities. Nevertheless, new proposals for building retrofitting potentially may cause a geographical dispersion of green commercial property in the near future. For urban Africa the South African experience of green property development is of considerable significance not least because of announcements that the green building movement is spreading into other parts of the continent. The World Green Building Council has mandated the GBCSA to nurture the establishment and support the activities of a wider network of green building councils throughout Africa (GBCSA, 2013a). With the birth of new such councils in Ghana, Kenya, Namibia and Nigeria and of other potential councils to be established in Botswana, Malawi, Tanzania, Zambia and Zimbabwe, there is a need for further monitoring of the roll out of green property developments in South Africa as laboratory and a potential source of learning for the rest of the continent.

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