GREEN BUILDING
IN SOUTH AFRICA

GUIDE TO
COSTS & TRENDS

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2019 EDITION

GREEN BUILDING COUNCIL SOUTH AFRICA

The Association of South African Quantity Surveyors

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YUNIBESITHI YA PRETORIA

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GUIDE TO COSTS AND TRENDS

PUBLISHED BY
THE GREEN BUILDING COUNCIL SOUTH AFRICA (GBCSA)
AND
THE ASSOCIATION OF SOUTH AFRICAN QUANTITY SURVEYORS (ASAQS)
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FOREWORD

The Green Building Council South Africa (GBCSA) was established in 2007. The event introduced a period of increased awareness and education in the South African built environment regarding the green building movement. With this emerged the perception that green building attracts a significant cost premium when compared to conventional construction. A similar view is likely to be held by other countries across the world.

To address this concern, the Cost of Green Building Study Committee was established in 2014, comprising of selected members from the GBCSA, the Association of South African Quantity Surveyors (ASAQS) and the University of Pretoria (UP).

The purpose of the committee was to determine the costs and trends associated with the cost of green buildings constructed in South Africa.

The first edition of the GREEN BUILDING IN SOUTH AFRICA – GUIDE TO COSTS AND TRENDS booklet was published in 2016. The thorough, peer reviewed and validated research ensured outcomes and results that are highly relevant to all in the built environment.

This 2019 edition includes convincing results that bring more focus by confirming previous outcomes and sharpening previous conclusions. It also includes additional analysis regarding the business case of green building to expand the study and provide greater insight.

NOTES TO CONSIDER

The reader of both the 2016 first edition (hereinafter referred to as the 2016 report) and the 2019 edition (hereinafter referred to as the 2019 report) must take note of the following assumptions and/or qualifications and use the findings of this study with due caution and discretion.

- The cost data used in the report has not been normalised to allow for differences in specification level required by the specific grade of office space provided (i.e. Premium grade, A grade, B grade, etc.) other than to evaluate the effect of base building cost on green cost premiums;
- The design methodology of the study used estimated cost based on elemental estimates for projects with "Design" Green Star certification and final cost for projects with "As Built" Green Star certification. The actual cost data available did not always allow for this methodology (i.e. only final cost data may have been available for a project with "Design" certification). However this deviation is not considered to be of significance as all study projects with both estimated and final cost available indicated only very minor/insignificant differences between the estimated and final cost;
- Changes in the National Building Regulations (SANS 10400) came into effect in 2011. These changes directly addressed design aspects of buildings associated with green building design. More exacting building regulations set for conventional construction should decrease the cost premium of green building. The changes in building regulations were not specifically considered by the report other than the evaluation of certification date on green cost premiums.

INTRODUCTION

The GBCSA was established in 2007. By the end of September 2018 a total of 400 buildings had been certified by the GBCSA, whilst more than 10,000 professionals had enrolled on GBCSA training courses.

The international green building industry has expanded and matured significantly during the past two decades. However a number of factors with the potential to hamper the growth of the industry have also been identified during this period. This includes the perception that green building attracts a significant cost premium when compared to the cost of non-green/conventional construction. Before the publication of the 2016 report, no data existed in South Africa to prove otherwise.

The purpose of the Cost of Green study is to describe the actual costs and trends of Green building in South Africa in a credible, unbiased, consistent and user friendly manner. The study findings are based on actual case studies of office buildings that have been awarded a Green Star certification.

The study includes all South African office buildings certified by the GBCSA which meet the following criteria

- Are 4, 5 or 6 Star Green Star certified buildings
- Have either “Design” and/or “As Built” ratings
- Used the Green Star Office v1/v1.1 rating tool

THE STUDY

The 2016 report included a sample of 54 office buildings owned by 34 different companies. The 2019 report includes a sample of an additional 91 office buildings owned by 52 companies that were certified from 2015 – 2018. Approval of owners was secured before the financial detail of their buildings was included in this study.

The Cost of Green study analysis of cost data and presentation of the findings is based on the ASAQS's *"Guide to Elemental Cost Estimating 2016"* and the GBCSA's *"Green Star Office v1/v1.1"* rating tool.

The study reports on two primary aspects of green building cost:

1. THE GREEN DESIGN PENETRATION

This indicates the extent to which the *"Green Star Office v1/v1.1"* rating tool has introduced green design into the different elements of a project, expressed as a percentage (%) of total project cost. For example a penetration factor of 45 % would indicate that green design has been integrated into 45 % of the total project budget.

2. THE GREEN COST PREMIUM

The green cost premium is defined as the additional cost of green building over and above the cost of conventional construction, expressed as a % of the total cost of the project. For example, a green building project which costs R100 million in total and includes green building costs of R3 million over and above the cost of conventional construction, is considered to have a green cost premium of R3m/R100m x 100/1 % = 3 %;

To describe green building cost in more detail, the above two primary aspects are then analysed in terms of the following:

- **Certification level**
  Evaluating green building costs in terms of the three different certification levels i.e. 4 Star, 5 Star, or 6 Star Green Star certification;
- **Location**
  Evaluating the effect of location on green building costs. Building costs often vary between different provinces in South Africa;
- **Construction area**
  Evaluating the effect of the size of a building on the green building cost premium (GBCP). Larger projects often attract more competitive building rates compared to smaller projects, due to economies of scale. Larger construction companies may achieve higher levels of efficiency/productivity. However, mega projects (i.e. major sport stadiums or power stations) may restrict effective competition which in turn may result in higher building costs;
- **Base building cost**
  Evaluating the effect of base building cost (R/m^2) on GBCP. A project with a higher base building cost could expect to have a lower GBCP. However, a project with a low base building cost could expect to have a higher green cost premium. The study evaluated the effect of base building cost on the GBCP;

- **Vertical façade ratio**
  Evaluating the effect of the vertical façade:construction area ratio on the GBCP. The interaction between a building and the physical environment takes place to a large degree via the vertical façade of the building. Therefore, the vertical façade area is closely associated with green building design. The study evaluated the effect of façade:construction area ratio on the GBCP;
- **Certification date**
  Evaluating the effect of time/maturity of the green industry on the GBCP. Green building has introduced new concepts to the construction industry. Over time, the risks associated with new green concepts are seen to be reducing and is being replaced by greater certainty in terms of green design and costs related thereto. The study evaluated the effect of time on the GBCP;
- **Tenant mix**
  Evaluating the effect of single corporate vs generic tenant mix on the GBCP. The majority of the office buildings certified by the GBCSA were buildings designed for single, corporate tenants. Corporate clients tend to place a high value on marketing and public image and should therefore be inclined to spend more on their buildings. The study evaluated the effect of tenant mix on the GBCP;

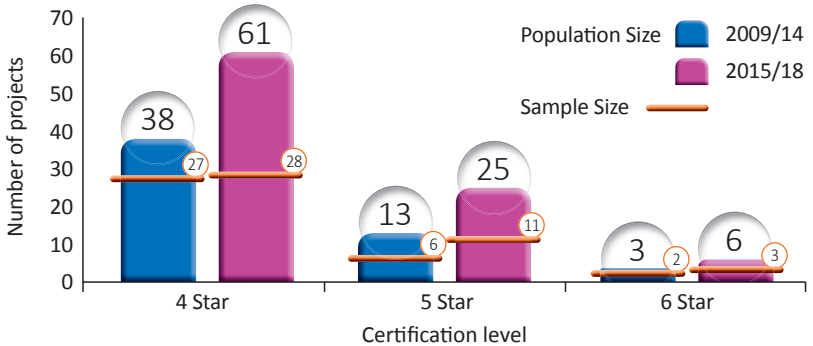
- **Certification rating**
  The Green Star Office v1/v1.1 tool allows for "Design" and "As Built" Green Star certification rating. The study evaluated the effect of the certification rating mix on the GBCP.
- **Rating tool categories**
  Evaluating the GBCP in terms of the categories of the Green Star Office v1/v1.1 tool. The Green Star Office v1/v1.1 tool consists of nine different categories and a total of 69 credits. The tool therefore offers many design alternatives when pursuing Green Star certification. The study evaluated the portion of the GBCP spent on each of the categories of the Green Star rating tool.
- **Additional analysis**
  Additional analysis has been included in the 2019 report which includes comparing the green building cost of public sector vs private sector office buildings and looks to expanding the "location" analysis to focus on important business nodes in future.

SAMPLE PROFILE

The profile of the combined study population size of 146 projects provides context for the study results which follow.

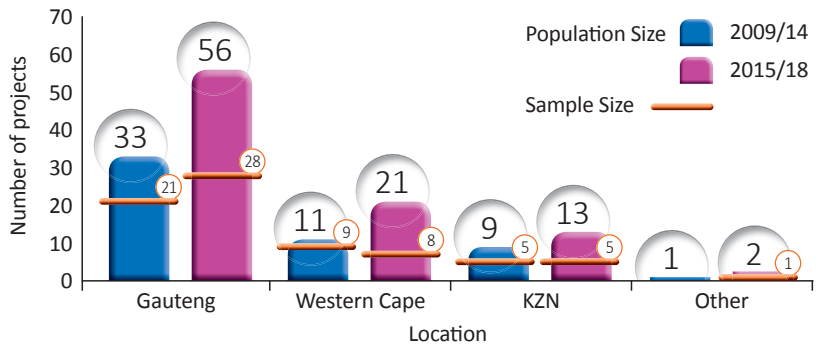
The study population size is made up of 54 projects (37,0 %) certified from 2009 – 2014 and 92 projects (63,0 %) certified from 2015 – 2018. A total of 99 projects (67,8 %) have a 4 Star Green Star certification, 38 projects (26,0 %) have a 5 Star Green Star certification and 9 projects (6,2 %) have a 6 Star Green Star certification (see Figure 1).

FIGURE 1 GBCSA CERTIFIED OFFICE PROJECTS 2009 - 2018



Of all certified office projects in the study population size a total of 89 office projects (61,0 %) are located in Gauteng with 32 office projects (21,9 %) from the Western Cape and 22 office projects (15,2 %) from Kwazulu-Natal (see Figure 2).

FIGURE 2 PROJECT LOCATION FOR OFFICE PROJECTS CERTIFIED

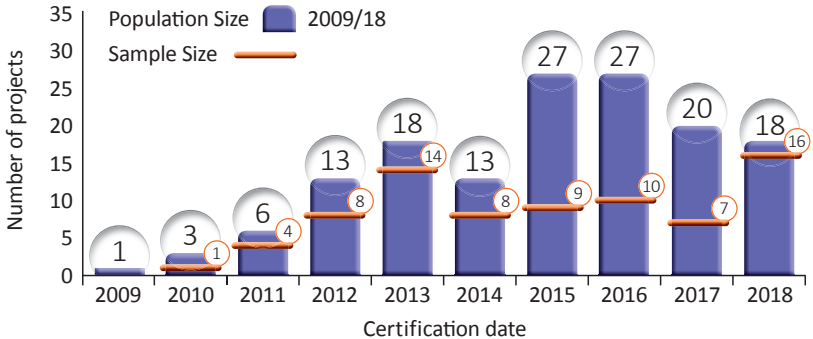


The number of office projects certified per year clearly indicates the substantial and sustained growth in green building in South Africa since 2009 (see Figure 3).

The slow-down in growth noticeable from 2016 – 2018 is largely due to the severely challenging business conditions experienced by the South African economy and specifically the construction industry during recent years.

*These projects only refer to GBCSA certifications of new office buildings using the Green Star Office v1/v1.1 tool

FIGURE 3 OFFICE PROJECTS CERTIFIED PER YEAR*



STUDY RESULTS

GREEN DESIGN PENETRATION

CERTIFICATION LEVEL

The study revealed that the application of the Green Star Office v1/v1.1 tool to pursue Green Star certification resulted in the introduction of green design elements accounting for an average of 42,4 % of the budgets of projects included in the sample (42,7 % in the 2016 report). For some projects more than 80 % of the budget included green design elements. No clear correlation was apparent between the different levels of certification and the green design penetration achieved (see Table 1).

TABLE 1 GREEN DESIGN PENETRATION – CERTIFICATION LEVEL

Certification level – Green design penetration (%)	MIN	AVERAGE	MAX
TOTAL	**15,4 %**	**42,4%**	**83,0 %**
4 STAR	15,4 %	41,1 %	81,0 %
5 STAR	22,2 %	47,3 %	83,0 %
6 STAR	15,8 %	38,4 %	45,9 %

CERTIFICATION DATE

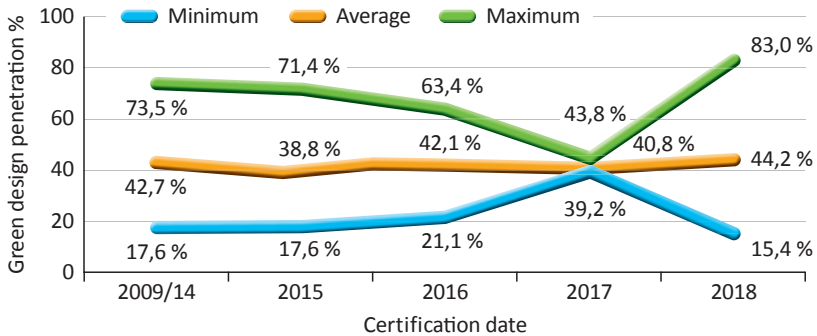
The average green design penetration of projects remained between 40 % and 45 %, except in 2015 when the average penetration level dropped to 38,8 % (see Table 2).

TABLE 2 GREEN DESIGN PENETRATION – CERTIFICATION DATE

Certification date – Green design penetration (%)	MIN	AVERAGE	MAX
TOTAL	**15,4 %**	**42,4 %**	**83,0 %**
2009/14	17,6 %	42,7 %	73,5 %
2015	17,6 %	38,8 %	71,4 %
2016	21,6 %	42,1 %	63,4 %
2017	39,2 %	40,8 %	43,8 %
2018	15,4 %	44,2 %	83,0 %

CERTIFICATION DATE continued

FIGURE 4 GREEN DESIGN PENETRATION – CERTIFICATION DATE



STUDY RESULTS

GREEN COST PREMIUM

CERTIFICATION LEVEL

The total average green building cost premium achieved by the projects sampled (as expressed by the median*) has reduced from 5,2 % in the 2016 report to 3,9 % in this report.

The average green cost premium of office projects certified in the period 2015 – 2018 has positively decreased from 5,2 % for the previous period 2009 – 2014 to 3,5 %.

*see note on page 18 for motivation of choice of median as indicator of central tendency

TABLE 3 GREEN COST PREMIUM – CERTIFICATION LEVEL

Certification level – Green cost premium (%)	MIN	AVERAGE	MAX
TOTAL	**1,1 %**	**3,9 %**	**14,2 %**
2009/14	1,1 %	5,2 %	14,2 %
2015/18	1,1 %	3,5 %	12,0 %

CERTIFICATION LEVEL continued

The average green building cost premium was 3,9 % of the total project cost. The lowest cost premium reported was 1,1 % and the highest was 14,2 %. Both Table 4 and Figure 5 indicate the positive correlation between green cost premium and certification level.

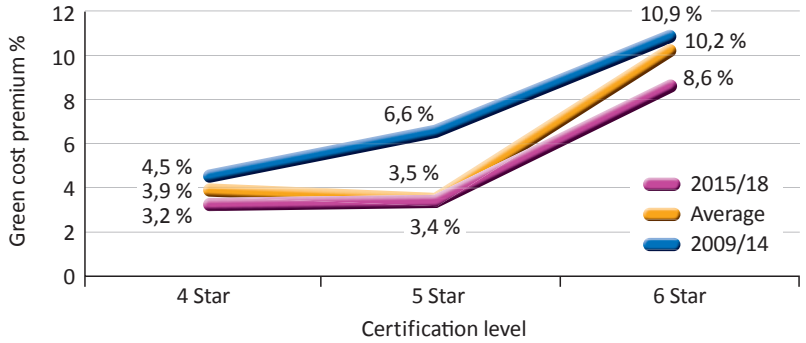
TABLE 4 GREEN COST PREMIUM – CERTIFICATION LEVEL

Certification level – Green cost premium (%)	MIN	AVERAGE	MAX
TOTAL	**1,1 %**	**3,9 %**	**14,2 %**
4 STAR	1,1 %	3,9 %	14,2 %
5 STAR	1,8 %	3,5 %	11,7 %
6 STAR	8,6 %	10,2 %	11,7 %

CERTIFICATION LEVEL continued

NOTE: *The choice of indicator for the central tendency of the data (to describe the average green building cost premium) was the median. The median is the midpoint of a frequency distribution or the numerical centre of a set of data. Since the data sample was right skewed (0,942), the median was chosen as the preferred indicator over the arithmetic mean as it is less sensitive to skewed data.*

FIGURE 5 GREEN COST PREMIUM – CERTIFICATION LEVEL



LOCATION

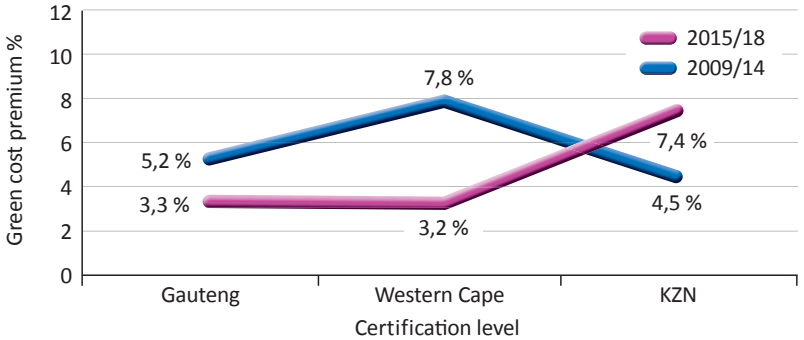
The average green cost premium of 6,3 % for projects in KZN was significantly higher when compared to the projects from other locations (see Table 5).

TABLE 5 GREEN COST PREMIUM – LOCATION

Location – Green cost premium (%)	MIN	AVERAGE	MAX
TOTAL	**1,1 %**	**3,9 %**	**14,2 %**
GAUTENG	1,1 %	3,9 %	10,7 %
WESTERN CAPE	1,7 %	3,4 %	14,2 %
KZN	3,6 %	6,3 %	11,7 %

LOCATION continued

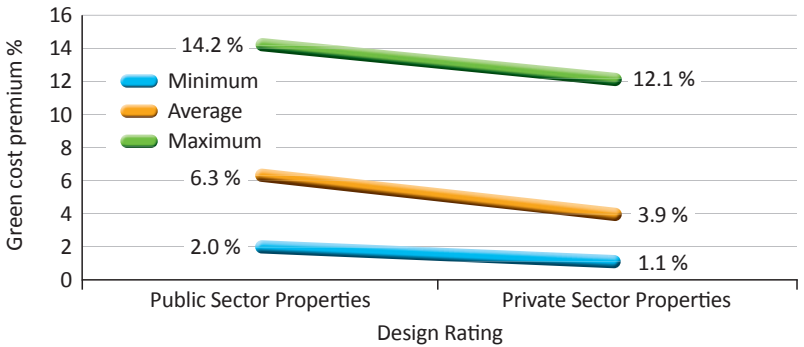
FIGURE 6 GREEN COST PREMIUM – LOCATION



PRIVATE VS PUBLIC SECTOR PROPERTIES

Private sector owned office buildings with Green Star certification seem to have a lower green cost premium compared to public owned office buildings

FIGURE 7 GREEN COST PREMIUM – PRIVATE VS PUBLIC SECTOR PROPERTIES



CONSTRUCTION AREA

Both Table 6 as well as Figure 8 confirm the strong negative correlation between green cost premium and construction size. The larger projects managed to achieve a Green Star certification at a much lower average green cost premium when compared to smaller projects.

TABLE 6 GREEN COST PREMIUM – CONSTRUCTION AREA

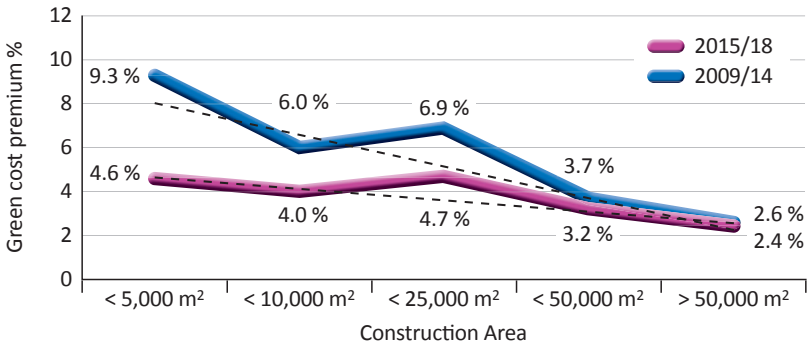
Construction area – Green cost premium (%)	MIN	AVERAGE	MAX
TOTAL	**1,1 %**	**3,9 %**	**14,2 %**
< 5,000 m²	3,4 %	5,1 %	12,2 %
< 10,000 m²	1,7 %	4,0 %	14,2 %
< 25,000 m²	2,7 %	5,2 %	12,0 %
< 50,000 m²	1,1 %	3,2 %	5,0 %
> 50,000 m²	2,0 %	2,4 %	3,9 %

CONSTRUCTION AREA continued

The previous strong negative correlation (r = –0,915) between green cost premium and construction size of office buildings was confirmed by the 2015/18 data (r = –0,906).

The data confirmed that the cost premium for buildings smaller than 5,000 m² has reduced significantly from 9,3 % to 4,6 %.

FIGURE 8 GREEN COST PREMIUM – CONSTRUCTION AREA



BASE BUILDING COST

The base building cost has been calculated as the total project cost minus the basement cost divided by the building construction area minus the basement area. To allow for the time value of money, all costs were escalated to December 2018. The base building cost of the project sample ranged from R9,428/m² to R25,161/m² with an average cost of R14,334/m². To evaluate the relationship between base building cost and green cost premium, the base building cost range was split into five categories that are

...continued overleaf

TABLE 7 GREEN COST PREMIUM – BASE BUILDING COST (AT 12/2018)

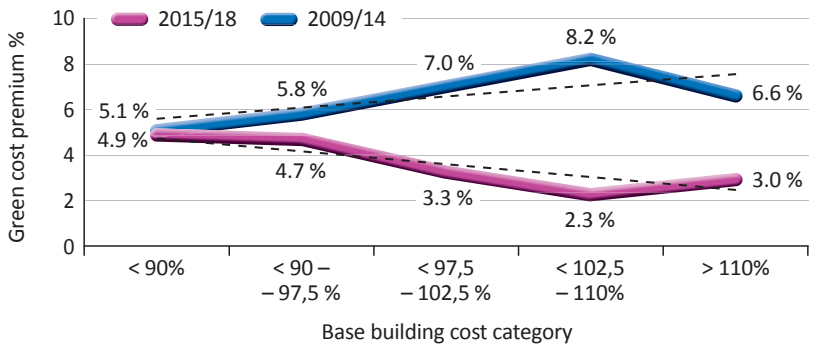
Base building cost (R/m²) – Green cost premium (%)	MIN	AVERAGE	MAX
< 90,0 %	1,7 %	5,0 %	11,7 %
< 97,5 %	1,1 %	4,7 %	9,8 %
< 102,5 %	1,1 %	3,3 %	7,4 %
< 110,0 %	1,8 %	3,6 %	10,0 %
> 110,0 %	2,0 %	3,0 %	12,2 %

BASE BUILDING COST continued

all defined in relation to the average cost. The categories are – much lower (< 90,0 %), lower (90,0 % – 97,5 %), similar (97,5 % - 102,5 %), higher (102,5 % - 110,0 %) or much higher (> 110,0 %) than the average base building cost.

The 2016 report revealed a positive relationship between base building cost and green cost premium (r = 0,68) in contrast to the expected outcome. Buildings from 2015 – 2018 however had a negative relationship between base building cost and green cost premium (r = – 0,83) (see Table 7 and Figure 9).

FIGURE 9 GREEN COST PREMIUM – BASE BUILDING COST



VERTICAL FAÇADE RATIO

The ratio of vertical façade:construction area of the sample projects varied from 0,24:1 to 0,84:1 with an average of 0,46:1. To evaluate the relationship between façade ratio and green cost premium, the façade ratio range was split into five categories that are all defined in relation to the average ratio. The categories are – much lower (< 0,38:1), lower (0,38 – 0,44:1), average (0,45 – 0,50:1), higher (0,51 – 0,56:1) or much higher (> 0,56:1) than the average ratio.

...continued overleaf

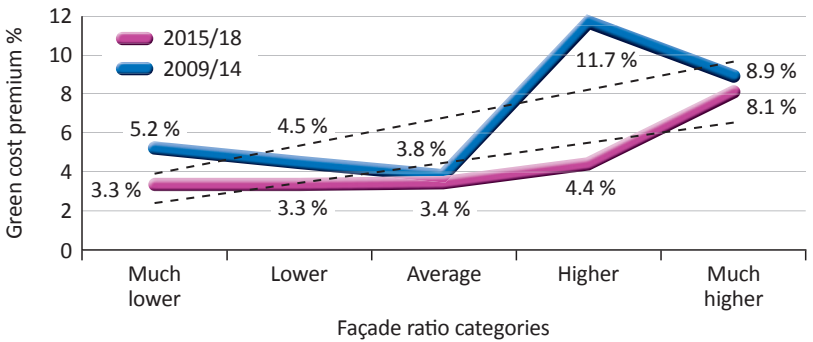
TABLE 8 GREEN COST PREMIUM – VERTICAL FAÇADE RATIO

Vertical façade ratio – Green cost premium (%)	MIN	AVERAGE	MAX
Much ↓ than average (< 0,38:1)	2,0 %	3,8 %	11,7 %
↓ than average (0,38 – 0,44:1)	1,1 %	3,6 %	8,2 %
Average (0,45 – 0,50:1)	2,0 %	3,8 %	10,0 %
↑ than average (0,50 – 0,56:1)	2,9 %	4,7 %	11,7 %
Much ↑ than average (> 0,56:1)	1,7 %	8,9 %	12,2 %

VERTICAL FAÇADE RATIO continued

Table 8 and Figure 10 indicate the correlation between vertical façade ratio and green cost premium. The 2015/2018 data revealed a strong positive correlation with the façade ratio (r = 0,807). This indicates that buildings with an above average vertical façade:construction area ratio also tend to have a much higher green cost premium.

FIGURE 10 GREEN COST PREMIUM – VERTICAL FAÇADE RATIO



CERTIFICATION DATE

The 2016 report suggested a maturing of the South African green industry with a slight decline in average green cost premium between 2010 - 2014. The 2019 report confirms that the green cost premium is declining as the green industry matures (r = −0,51). Table 9 and Figure 11 indicate as a general trend that since 2011, green cost premiums appear to be declining.

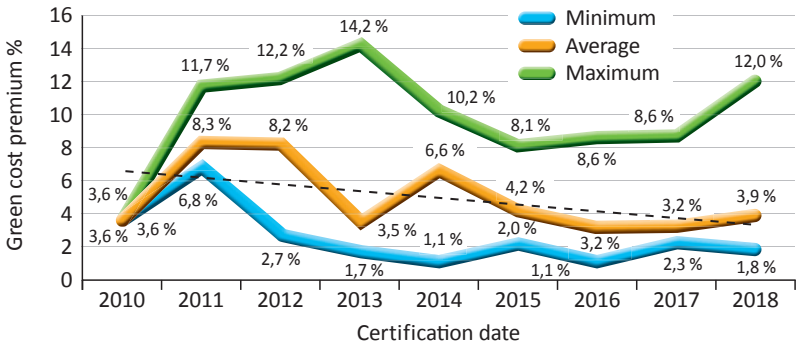
TABLE 9 GREEN COST PREMIUM – CERTIFICATION DATE

Certification date – GCP (%)	MIN	AVERAGE	MAX
2010	3,6%	3,6%	3,6%
2011	6,8%	8,3%	11,7%
2012	2,7%	8,2%	12,2%
2013	1,7%	3,5%	14,2%
2014	1,1%	6,6%	10,2%
2015	2,0%	4,2%	8,1%
2016	1,1%	3,2%	8,6%
2017	2,3%	3,2%	8,6%
2018	1,8%	3,9%	12,0%

GCP = Green Cost Premium

CERTIFICATION DATE continued

FIGURE 11 GREEN COST PREMIUM – CERTIFICATION DATE



TENANT MIX

Table 10 and Figure 12 confirm that projects with a single corporate client, will on average have a higher green cost premium compared to projects with a multiple tenant mix.

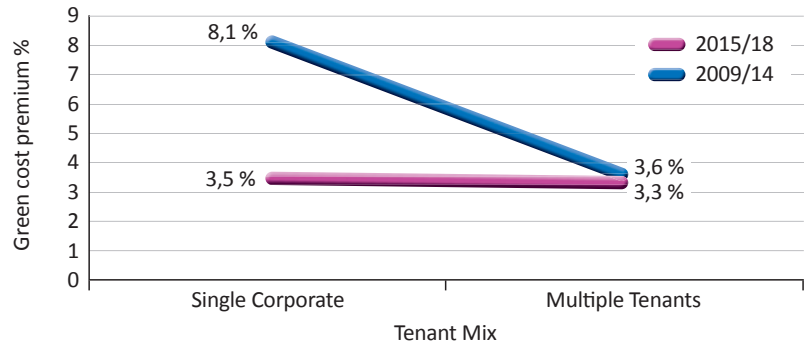
The gap between the green cost premium of single tenanted buildings vs multiple tenant buildings did however narrow dramatically from 4,5 % in the 2016 report to 0,2 % for the 2015 – 2018 projects.

TABLE 10 GREEN COST PREMIUM – TENANT MIX

Tenant mix – Green cost premium (%)	MIN	AVERAGE	MAX
TOTAL	**1,1 %**	**3,9 %**	**14,2 %**
SINGLE CORPORATE	1,8 %	4,9 %	14,2 %
MULTIPLE TENANTS	1,1 %	3,4 %	12,0 %

TENANT MIX continued

FIGURE 12 GREEN COST PREMIUM – TENANT MIX



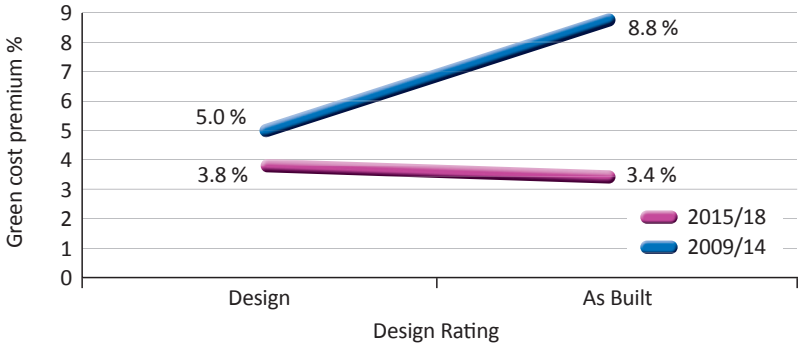
CERTIFICATION RATING

An evaluation of the "Design" versus the "As Built" Green Star certification rating achieved by the sample projects, revealed that from 2009 – 2014 projects with a "Design" certification rating maintained a lower average green cost premium compared to projects with an "As Built" certification rating. However from 2015 – 2018 the projects with an "As Built" certification rating had a lower average green building cost premium.

2009 – 2014 projects: 5,0 % vs 8,8 %

2015 – 2018 projects: 3,8 % vs 3,4 %.

FIGURE 13 GREEN COST PREMIUM – DESIGN CERTIFICATION RATING



RATING TOOL CATEGORIES

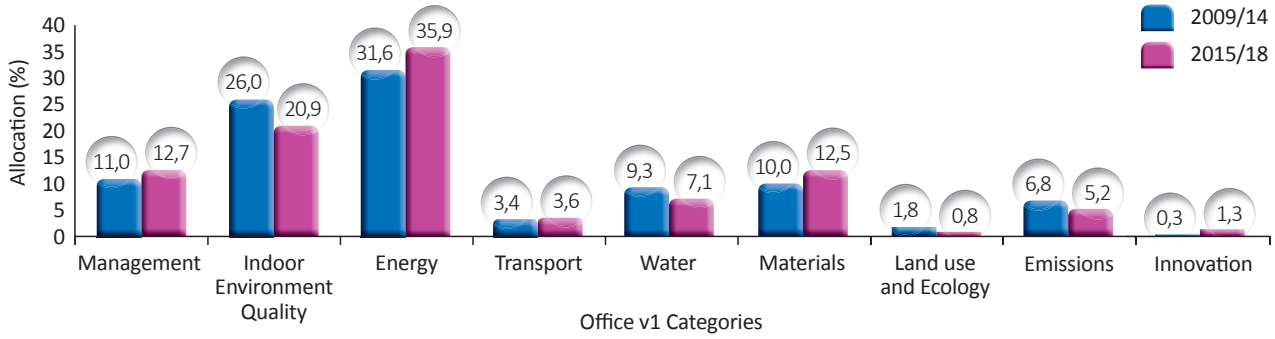
The allocation of the green cost premium to the nine categories of the Green Star Office v1 tool revealed that more than 57 % of the total green cost premium was allocated to only two categories namely, Energy and Indoor Environment Quality. It is notable that the five categories comprising Energy, Indoor Environment Quality, Management, Materials and Water, made up for more than 88 % of the total green cost premium allocation (see Table 11 and Figure 14).

TABLE 11 GREEN COST PREMIUM – RATING TOOL CATEGORIES

Rating tool categories	Green cost premium allocation (%)
MANAGEMENT	11,9
INDOOR ENVIRONMENT QUALITY	23,3
ENERGY	33,9
TRANSPORT	3,5
WATER	8,2
MATERIALS	11,3
LAND USE AND ECOLOGY	1,3
EMISSIONS	5,9
INNOVATION	0,8

RATING TOOL CATEGORIES continued

FIGURE 14 GREEN COST PREMIUM – RATING TOOL CATEGORIES



CONCLUSION

- Green building in South Africa has grown significantly since 2009;
- Office buildings of all sizes have successfully applied for Green Star certification;
- Green Star certified buildings are currently located predominantly in Gauteng, the Western Cape and the Durban/Umhlanga area of Kwazulu-Natal;
- The total average green cost premium over and above the cost of non-green buildings is 3,9 % for the cumulative period 2009 – 2018 compared with 5,2 % for the previous period 2009 – 2014. This is supported by a positive reduction in the average green cost premium to 3,5 % for the period 2015 – 2018;
- Since 2015, generic office buildings that have been developed for a multi-tenant mix, make up for 71 % of all Green Star certified buildings;
- Pursuing Green Star certification through the Green Star Office v1/v1.1 tool, has resulted in an average green design penetration of 42,4 % of the total project budget;
- Higher levels of certification (4 Star, to 5 Star, to 6 Star) has resulted in a progressive increase in the green cost premium;
- The green cost premium appears to be progressively diminishing over time, largely as a result of a growing maturity in the green industry;

- Compared to smaller office buildings, large office buildings generally achieved Green Star certification with lower green cost premiums;
- Office buildings with higher vertical façade:construction area ratios tended to have higher green cost premiums;
- Office buildings that were developed for single corporate tenants had initially attracted higher green cost premiums compared to buildings developed for a multi-tenant mix. Since 2015 this gap has almost disappeared;
- Originally, office buildings with higher base building costs did not necessarily achieve lower green cost premiums, but more recently such buildings seem to be achieving lower green cost premiums and
- Two categories of the Green Star Office v1/v1.1 tool i.e. Energy and Indoor Environment Quality made up for 58 % of the allocation of the total green cost premium.

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Solid Green Consulting

Terramanzi

WSP

The ASAQS, GBCSA and UP sincerely thank all building owners, Quantity Surveyors and Green Star Accredited Professionals who contributed to this updated study by providing the necessary project cost data.

*With reference to the new 2015/18 projects, special mention must be made of **Abland** who contributed 11 projects for the study, to **Quanticost** who submitted 12 financial transparency disclosures, to **WSP** who submitted details on 21 projects and to **Solid Green** who submitted details on 19 projects.*

SUPPLEMENT

EXTRACTS FROM

INSIGHTS FOR PERFORMANCE

IPD SA ANNUAL GREEN PROPERTY INDEX

JULY 2018

COURTESY OF MSCI

The focus of attention thus far in the ASAQS/GBCSA/UP study has been on the cost premium of a Green Star certified building over and above the cost of a non-green certified building based on the initial capital cost.

In terms of real estate investment, both the initial capital cost and the financial performance of a building in operation are important. The "business case" for a comprehensive investment decision should include both the cost premium on the initial capital cost of a Green Star certified building and the financial performance of the building in operation.

The financial performance of a building includes its income generating ability/potential and the eventual calculation of its market value. The income generating ability of a building will be affected by aspects such as average rentals achieved, rental/income growth, operating cost and vacancy rates.

Higher average rentals, higher rental growth, lower operating cost and lower vacancy rates will all increase the operational income of a building. The calculation of the market value of a building will be influenced by the capitalisation rate applied. If the risk associated with the future cash flow stream of a building is reduced (with a corresponding reduction in the capitalisation rate used to calculate the market value) the result will be a higher market value.

IPD SA ANNUAL GREEN PROPERTY INDEX* continued

The MSCI index extracted from Insights for Performance - IPD SA Annual Green Property Index – July 2018 is based on the financial performance of Green Star certified buildings vs non-green certified buildings in South Africa. The results are positive for Green Star certified building.

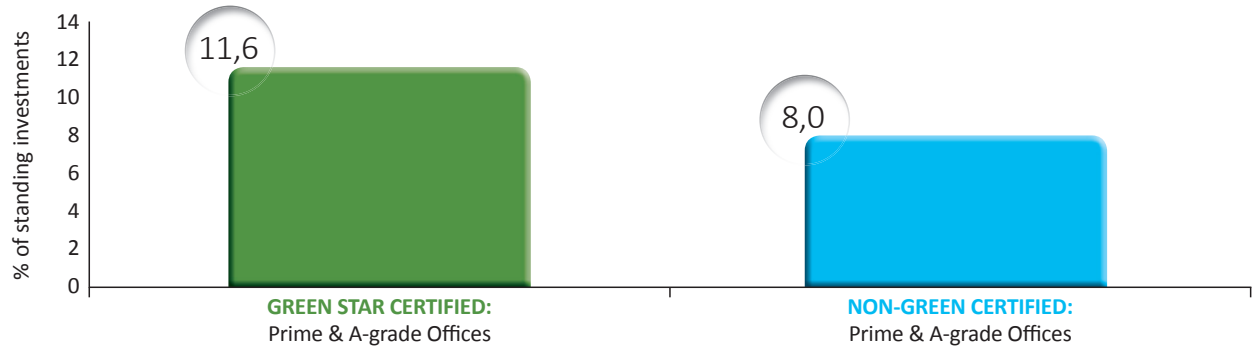
The MSCI index based on the financial performance of a building together with the GBCSA/ASAQS/UP data based on the green cost premium on the initial capital cost of a building, produces a convincing business case in support of Green Star certified buildings.

* The IPD Green Property Index is an annual index released jointly every year by MSCI and GBCSA and is sponsored by Growthpoint.

SAMPLE SIZE PRIME & A-GRADE OFFICES – DECEMBER 2017

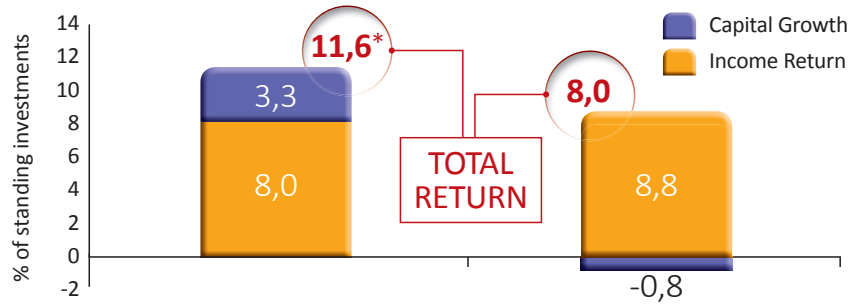
OUTPERFORMANCE ON 2017 TOTAL RETURN

FIGURE S1 TOTAL RETURN



DRIVEN BY SUPERIOR CAPITAL GROWTH

FIGURE S2 CAPITAL GROWTH AND INCOME RETURN



**The components of Total Return are calculated separately using chain-lined time weighted rates of return. Multi-period capital growth and income return do not always add up perfectly when determining Total Return, due to the cross product that occurs when the Capital and Income Returns are combined within compounded Total Returns. Therefore, in this particular instance when adding up the Capital and Income Return components they do not exactly equal the Total Return.*

VALUATION METRICS & PROPERTY FUNDAMENTALS

FIGURE S3 DISCOUNT RATE

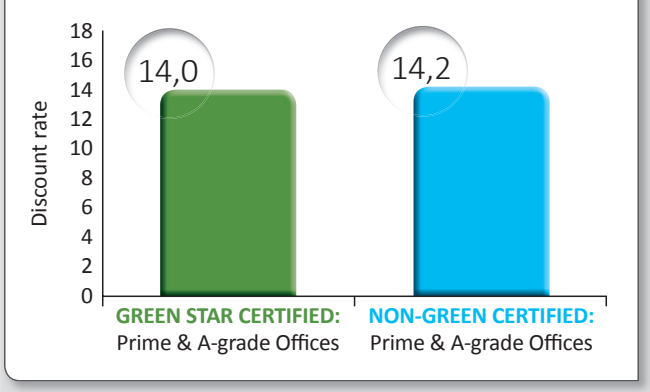
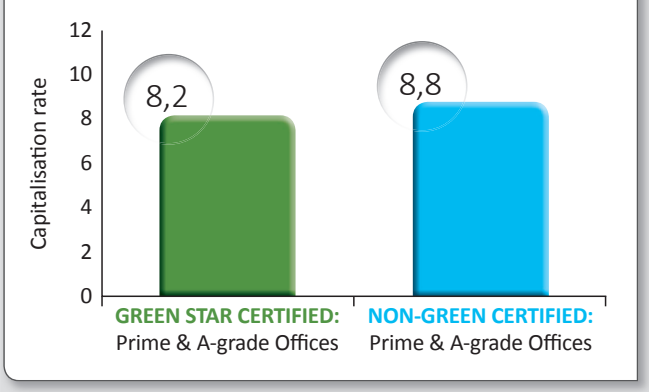


FIGURE S4 CAPITALISATION RATE



VALUATION METRICS & PROPERTY FUNDAMENTALS continued

FIGURE S5 NET INCOME GROWTH

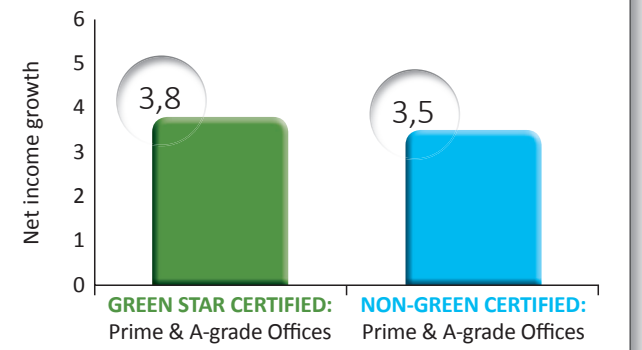
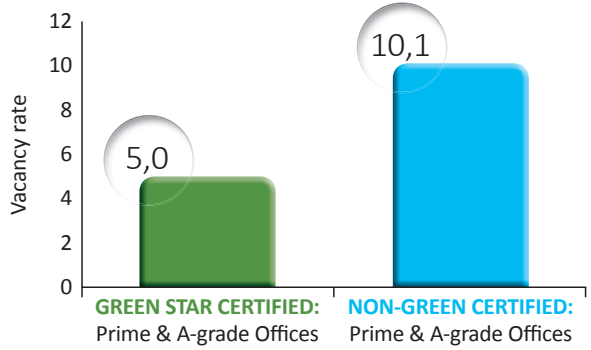


FIGURE S6 VACANCY RATE



FINDINGS GREEN STAR CERTIFIED OFFICES MORE EFFICIENT

1 % LESS ELECTRICITY & 24 % LESS WATER THAN NON-CERTIFIED

FIGURE S7 ELECTRICITY USAGE

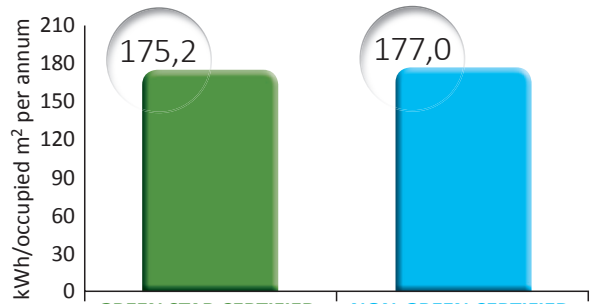
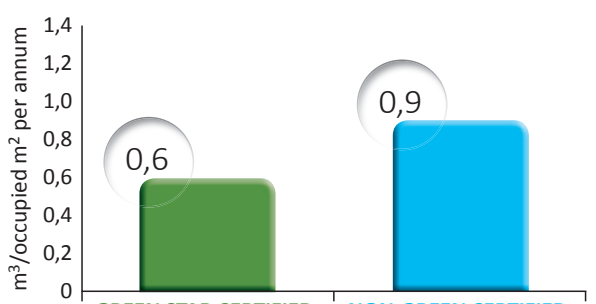


FIGURE S8 WATER USAGE



CONCLUSION

- Green Star certified prime and A-grade offices produced a total return of 11,6 % in 2017 vs 8,0 % for non-green certified prime and A-grade offices.
- Capital growth drove outperformance (3,3 % vs - 0,8 %).
- Green Star certified prime and A-grade offices reported a 1 % lower electricity usage per occupied square metre and a 24 % lower water usage per occupied square metre.
- Green Star certified office capital growth is driven by superior valuation metrics and property fundamentals:
  - Lower discount rate
  - Lower capitalization rate
  - Higher net income per m^2
  - Higher net income growth
  - Lower vacancy rate

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