BIM Harambee .Africa

26 July 2024: Session 3

Achieving Net-Zero

BIM Career Professionals Panel

Speaker: Thomas Fuller
Development Manager, JT Ross Property Group

Driving factors

ENVIRONMENTAL: ESG

MSCI

GRESB®

FTSE Russell

TCFD | TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

SUSTAINALYTICS

Raising the BIM tide

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ENVIRONMENTAL: ESG

LEGISLATIVE CHANGES TO PROPERTY REPORTING

KIV™

Sustainable Businesses:

POST COVID WORLD:

In a post Covid World Tenants are focusing more closely on:

- Gross Cost of Occupation
- Employee Experience
- Efficient utilisation, functionality and operation of Commercial Office Space

Developers / Investors / Landlords:

- Reducing Gross Cost of Occupation through Design Improvements
- Creating Flexible and Adaptable Office Spaces
- Improvements to the Tenant Experience

ENVIRONMENTAL: Statutory compliance

Key Compliance driving "E"

- SANS 10400 XA version 2
  - Includes set energy intensity targets per building class
- City of Johannesburg/ Tshwane Green Building By laws
  - Aligns with SANS 10400 targets
  - Prescribes minimum system requirements and initiatives to put in place
    - Rainwater harvesting
    - Solar etc.

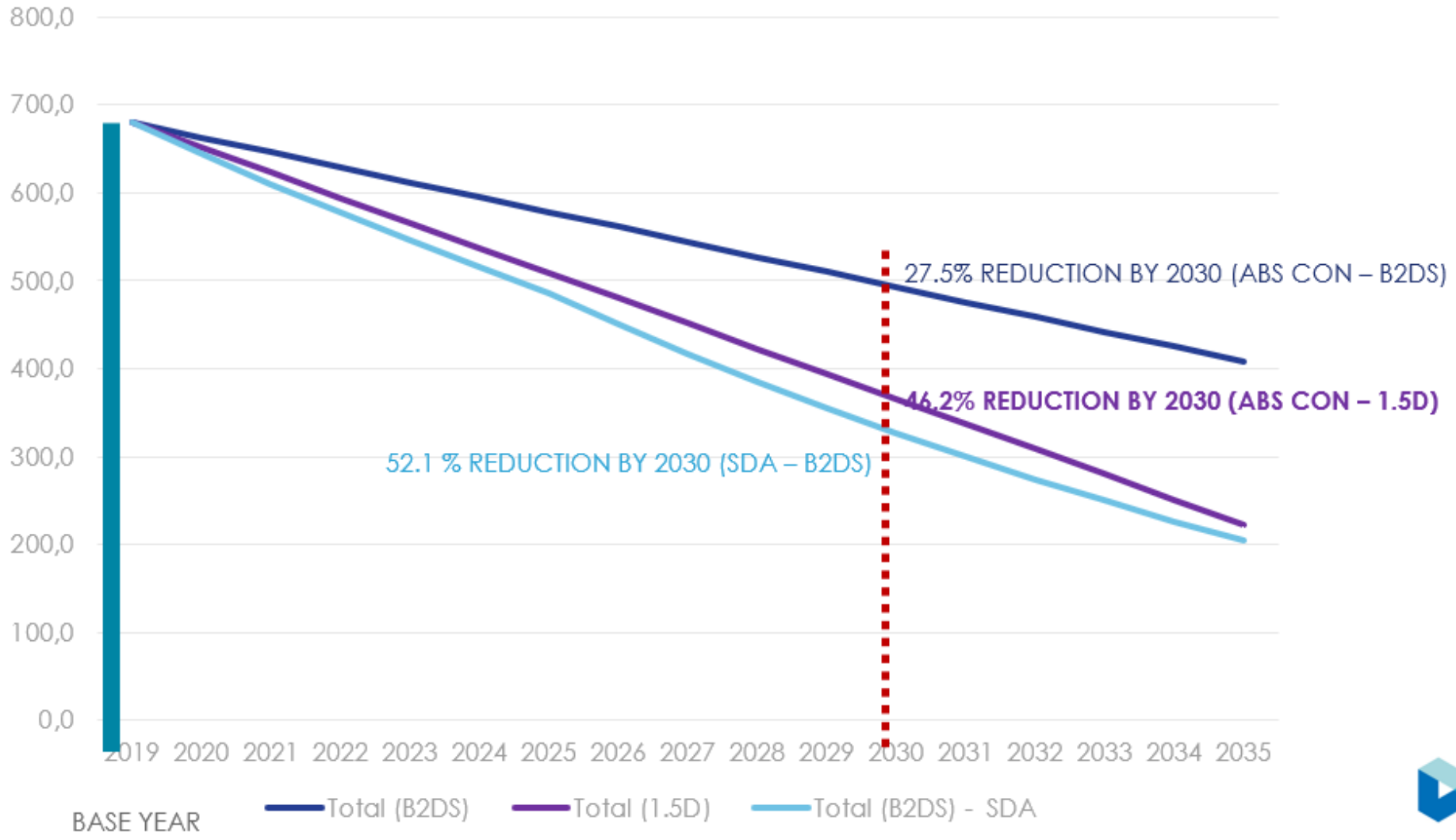
Table 2 — Maximum annual consumption per building classification for each energy zone (Kw.h/m2/a)

1	2	3	4	5	6	7	8	9
Class of Occupancy	**1**	**2**	**3**	**4**	**5**	**5H**	**6**	**7**
G1 Large multi storey office buildings, banks, consulting rooms and similar uses with lifts and energy consuming services that operate on a typical daytime occupancy.	80	80	100	75	95	95	90	90

ENVIRONMENTAL: SBTI

SCIENCE BASED TARGETS & CARBON ACTION PLAN

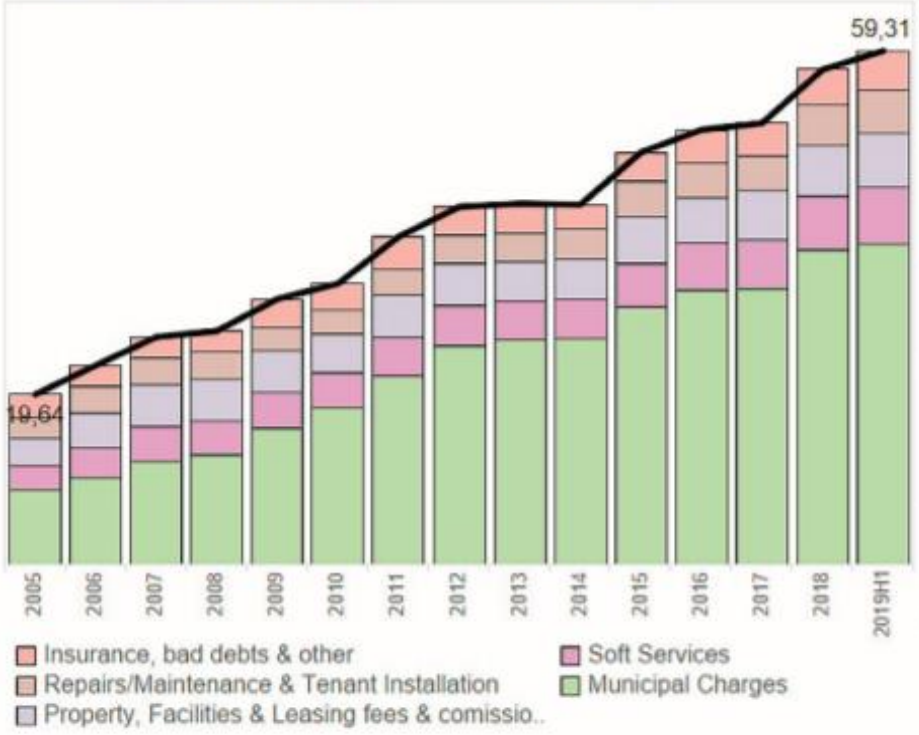
ENVIRONMENTAL: AS A PILOT



GROSS COST OF OCCUPATION

Operating cost by Cost Category

Operating Cost category trend; Rand per sqm



% of Total Operating Cost

2019H1

Municipal Charges	Electricity	30.0%
	Municipal Charges	7.2%
	Rates and Taxes	25.2%
	Total	62.3%
Property, Facilities & Leasing fees & comissions	Building Management	2.9%
	Letting Fees and Commissions	1.4%
	Management Costs	6.0%
	Total	10.4%
Insurance, bad debts & other	Bad Debts	1.4%
	Insurance	1.3%
	Other Operating Costs	4.8%
	Total	7.6%
Repairs/ Maintenance & Tenant Installation	R&M: Air Conditioning	1.4%
	R&M: Building Fabric	4.5%
	R&M: Elevators/Escalators	0.7%
	Tenant Installation Costs	1.9%
	Total	8.5%
Soft Services	Cleaning	4.4%
	Gardens	0.7%
	Security	6.0%
	Total	11.2%
Grand Total		100.0%

OPERATIONAL SUSTAINABILITY: Baseline

What can't we control when it comes to gross cost of occupation:

- Rate in the Rand
- Electrical tariffs
- Water Tariffs

ENVIRONMENTAL: vs BUSINESS STRATEGY

Our purpose

To create smart, safe and sustainable community spaces providing remarkable experiences in our managed hubs.

Our vision

To create sustainable value for all stakeholders through our value-based strategy, ensuring positive impact in our communities and environment we operate in.

VS.

Our purpose

To create smart, safe and sustainable community spaces providing remarkable experiences in our managed hubs.

Our vision

To create sustainable value for all stakeholders through our value-based strategy, ensuring positive impact in our communities and environment we

We think differently about real estate through our quality spaces, including the development of Waterfall City into a smart, safe and sustainable city. We drive the enhancement of what we do by putting people first and embracing business disruptions by exploring the new opportunities.

Our spaces, collectively called hubs

- Retail-experience hubs
- Collaboration hubs
- Logistics hubs

"E" = Embedded into our core business activities:

1. **ACQUIRE** Build or Buy
2. **FINANCE**
3. **OPERATE MAINTAIN**
4. **DISPOSE**

*"To be truly **efficient, resilient** and **smart** in the way we **plan**, **design** and **operate** a portfolio including a city, infrastructure and buildings both now and in the future."*

*" Year on Year improvement in **consumption performance against baselines** through the implementation of initiatives aimed at **reducing the cost of occupancy, carbon footprint** and achieving our **reduction targets**."*

E PLAN: 4 – POINT PLAN

The environmental plan, approved by the TSE, is built on four steps:

1. Set reduction targets
2. Develop key initiatives or requirements for new and existing buildings
3. Investigate feasibility of initiatives and its impact on Attacq and its stakeholders
4. Implement selected initiative

STEP 1

Set reduction targets

(short-term KPI – FY22)

During FY21, we established our externally assured baseline according to the Science Based Target Initiative methodology and in alignment with the Paris climate accord. In addition, we created an online eco-analytics dashboard to monitor our monthly results.

We will set specific targets for FY30 and FY50 that are pragmatic and drive sustainable business, for performance per property sector and across our real estate portfolio, for all elements of carbon emission generation and intensity reduction.

STEP 2

Develop key initiatives or requirements for new and existing buildings

(short to long-term KPI – FY22/FY23)

Develop a cost-efficient road map of initiatives and requirements in support of our FY30 and FY50 reduction targets for energy, water and waste as the key elements to achieve our carbon emission reduction targets.

STEP 3

Investigate feasibility of initiatives and impact

(short to long-term KPI – FY23 and beyond)

Implement those initiatives that are most effective. Initiatives will be assessed and ranked as follows:

- **Green:** low-cost day-to-day or behavioural improvements that are easy to implement.
- **Yellow:** medium-cost improvements that require business cases, budget and planning of implementation.
- **Red:** high-cost improvements including major retrofits, new buildings and infrastructure that require business cases, budget and planning of implementation. Asset management and operational budget alignment and integration with environmental plan. New development hurdle rates to inform the development of a carbon-neutral budget for investment committee approval.

STEP 4

Implementation of selected initiatives

(short to long-term KPI – FY22 and beyond)

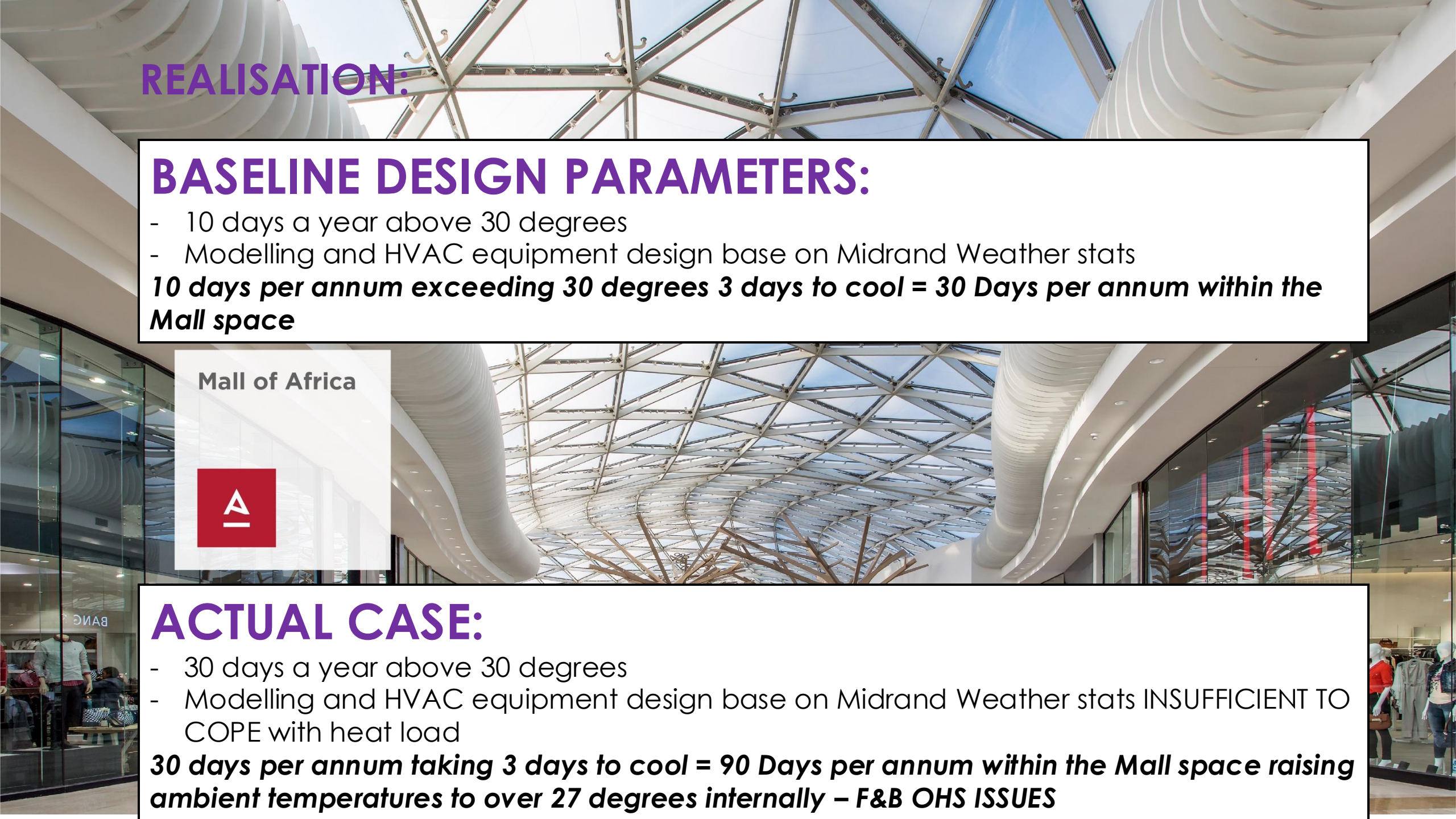
As our initiatives are implemented, reduction targets (carbon emission scopes 1, 2 and 3) versus actual performance will be monitored via our eco-analytics dashboard, in terms of carbon emission reduction targets, for each element (energy, water and waste).

REALISATION:

BASELINE DESIGN PARAMETERS:

- 10 days a year above 30 degrees
- Modelling and HVAC equipment design base on Midrand Weather stats

10 days per annum exceeding 30 degrees 3 days to cool = 30 Days per annum within the Mall space

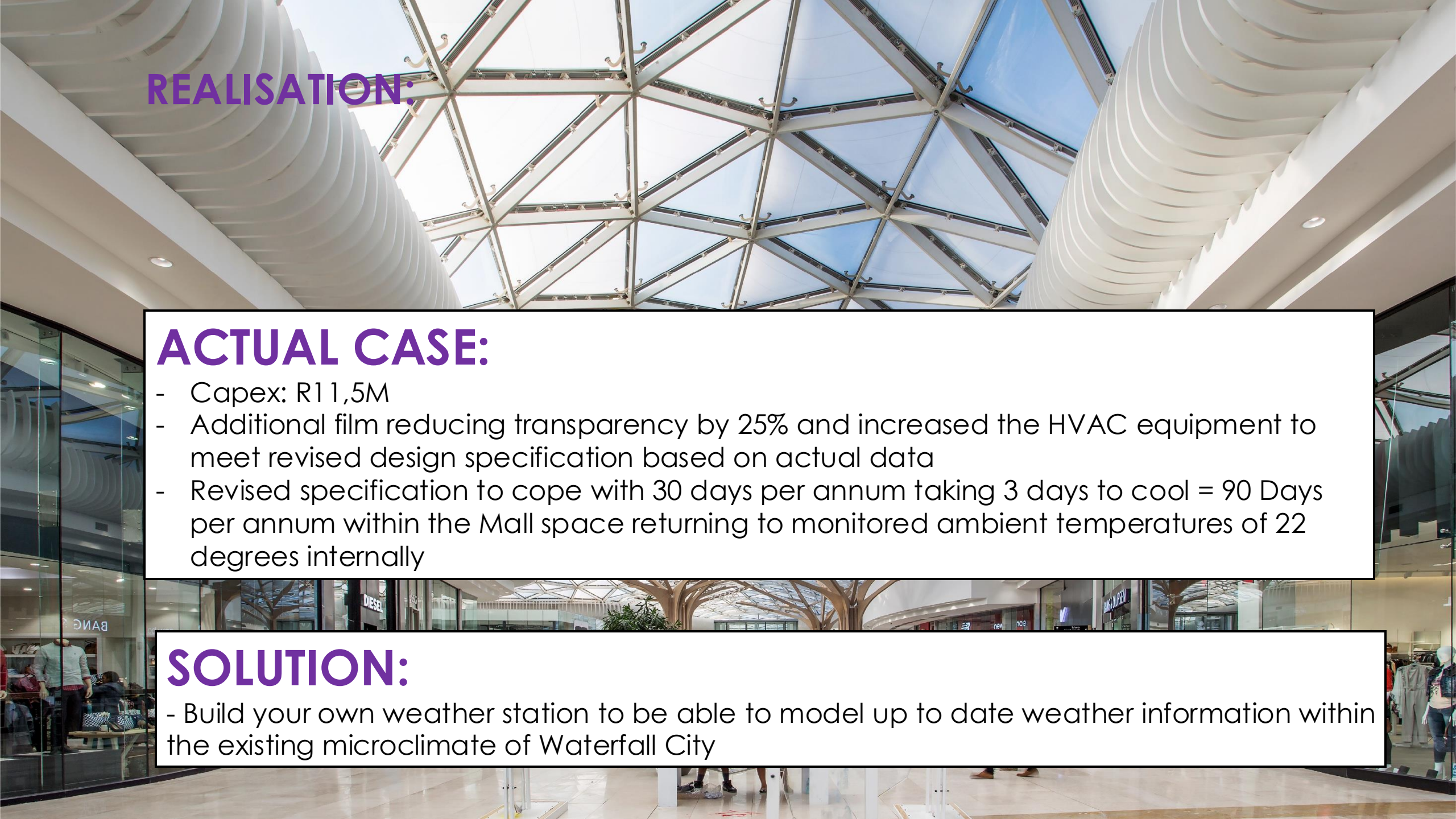


ACTUAL CASE:

- 30 days a year above 30 degrees
- Modelling and HVAC equipment design base on Midrand Weather stats INSUFFICIENT TO COPE with heat load

30 days per annum taking 3 days to cool = 90 Days per annum within the Mall space raising ambient temperatures to over 27 degrees internally – F&B OHS ISSUES

REALISATION:



ACTUAL CASE:

- Capex: R11,5M
- Additional film reducing transparency by 25% and increased the HVAC equipment to meet revised design specification based on actual data
- Revised specification to cope with 30 days per annum taking 3 days to cool = 90 Days per annum within the Mall space returning to monitored ambient temperatures of 22 degrees internally

SOLUTION:

- Build your own weather station to be able to model up to date weather information within the existing microclimate of Waterfall City


ENCHA
teva

Attacq

Data

Battery

Current weather condition | Last update: 11/23/2020, 7:50:00 AM

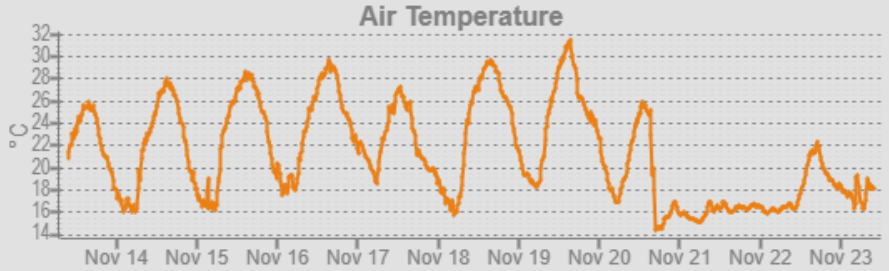
Temperature	18.1 °C
Rel. humidity	76.6 %
Rain Yesterday	29.6 mm
Visible light	21.2 Lux
Solar Irradiance	189.1 W/m²

Wind speed and direction

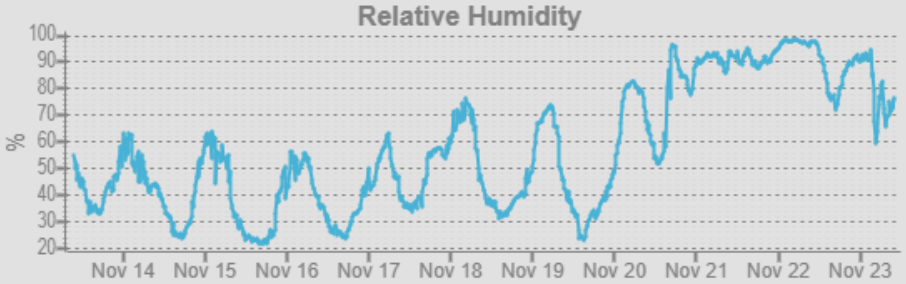
NO2	0.0 PPM
SO2	0.0 PPM
CO	0.1 mm
O3	0.0 Lux
PM2.5	0.5 W/m²

- Air quality

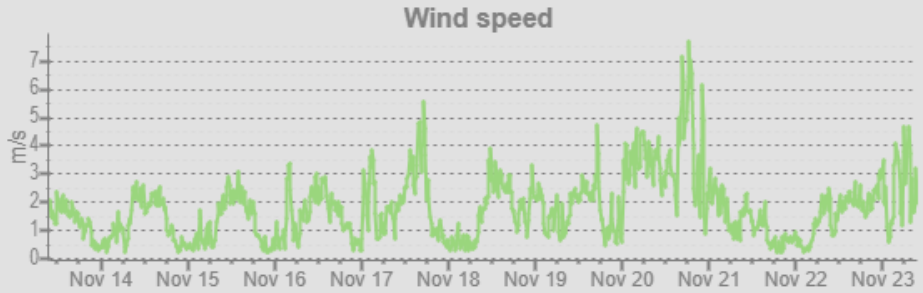
- Temp

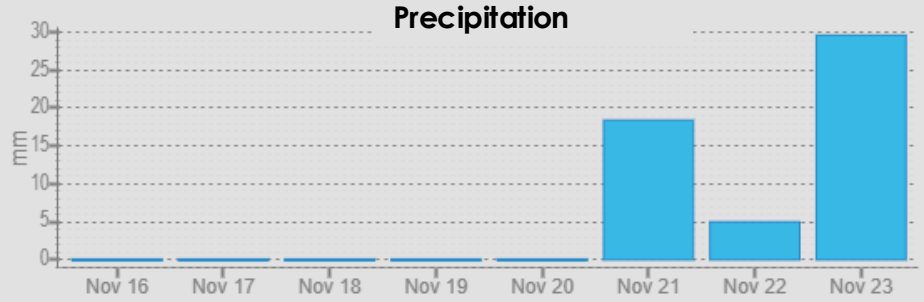


- Humidity

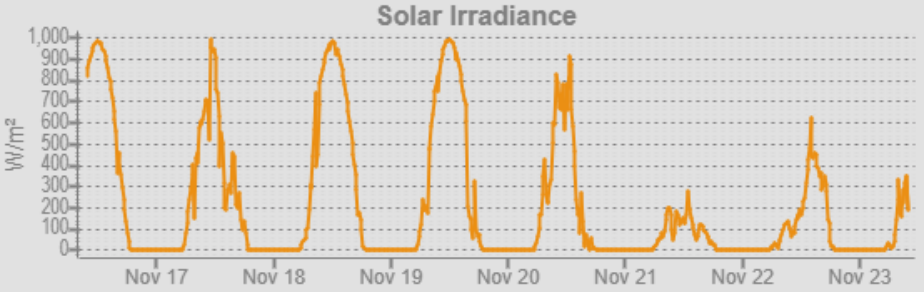


- Wind direction

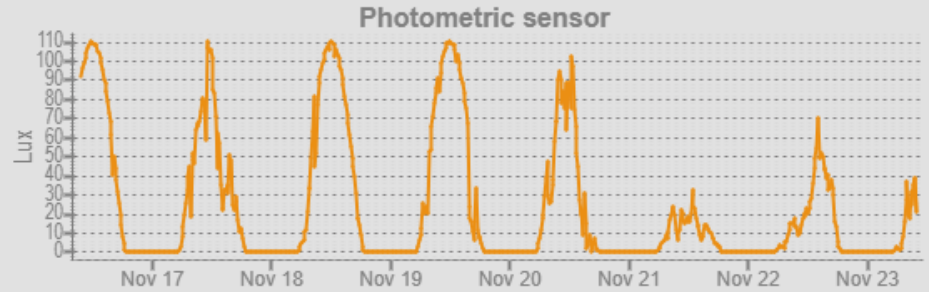




- Rainfall patterns



- Power available for solar



- Daylight levels

OPERATIONAL SUSTAINABILITY: Hindsight is 20/20

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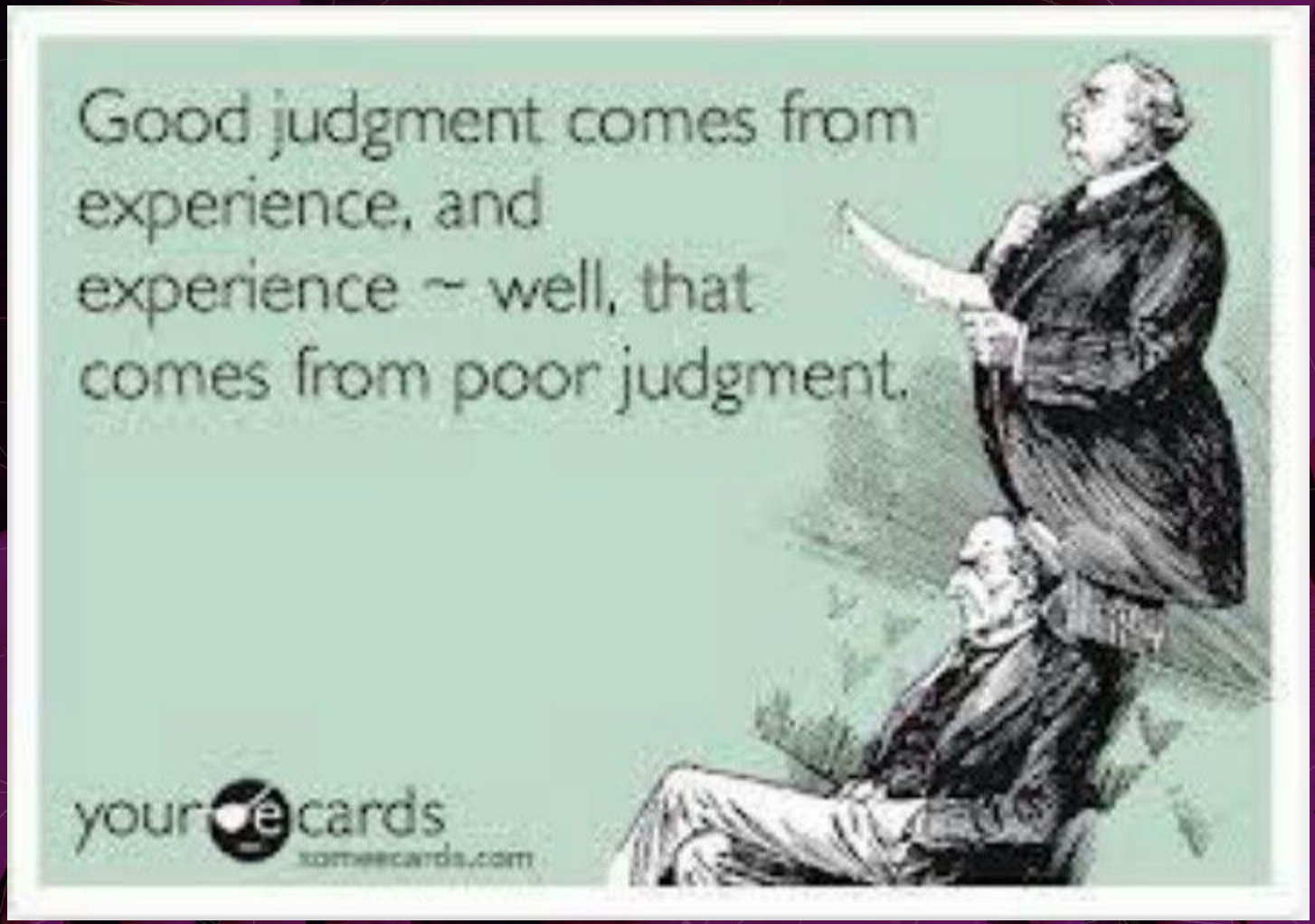
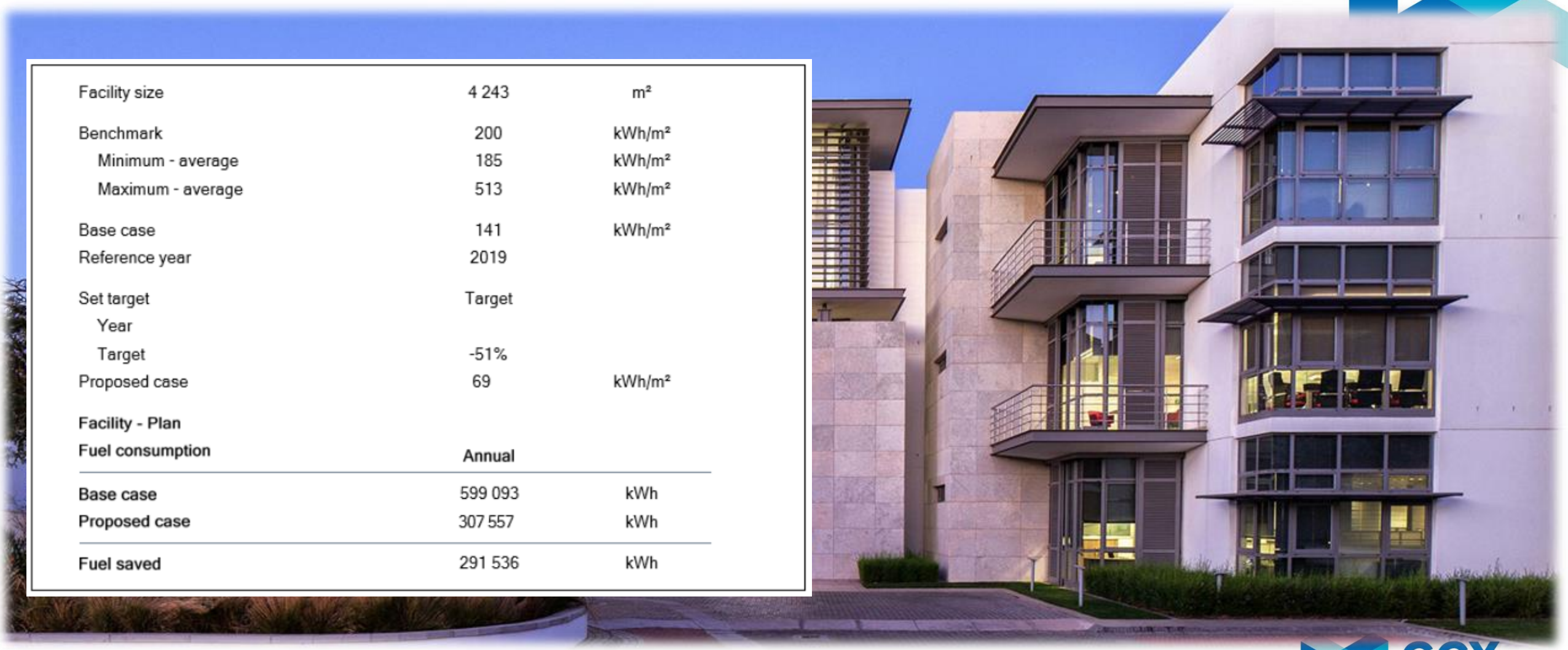


ENVIRONMENTAL: ENERGY AUDIT RECOMMENDATIONS

Facility size	4 243	m²
Benchmark	200	kWh/m²
Minimum - average	185	kWh/m²
Maximum - average	513	kWh/m²
Base case	141	kWh/m²
Reference year	2019	
Set target	Target	
Year		
Target	-51%	
Proposed case	69	kWh/m²

Facility - Plan

Fuel consumption	**Annual**	
Base case	599 093	kWh
Proposed case	307 557	kWh
Fuel saved	291 536	kWh



GCX

ENVIRONMENTAL: ENERGY AUDIT RECOMMENDATIONS

No.	ECM List	Estimated Savings				CAPEX	Payback
		kWh Per Annum	% Savings	Rand Per Annum	Ton CO2 Per Annum		
1	Energy Efficient Lighting	66 922	11.5%	R 88 337	70	R 55 400	0.63
2	HVAC Setpoint Temperature	2 617	0.8%	R 3 454	3	R -	0
3	Solar Passive Roof Cooling	4 065	1%	R 5 366	4	R 35 000	6.52
4	Demand Control Ventilation	65 148	10.9%	R 85 995	68	R 100 000	1.16
5	HVAC Economizer Retrofit	5 281	1.23%	R 6 971	5	R 100 000	14.35
6	Reduce Heat Pump Operating Hour Schedule	20 878	3.8%	R 27 559	22	R 1 500	0.05
7	Reduce HVAC Operating Hour Schedule	9 920	2.2%	R 13 094	10	R -	0
8	Building Plug Load Reductions	39 428	7%	R 52 045	41	R 150 000	2.88
9	65kWp Rooftop Solar PV System	77 277	13%	R 102 006	80	R 715 000	7.01
TOTAL SAVINGS		**291 536**	**51%**	**R 384 828**	**303**	**R 1 156 900**	**3.0**

Note: Reduce the electrical density / m^2 and then add PV

GCX

ENVIRONMENTAL: ENERGY AUDIT RECOMMENDATIONS

BASE BUILD:

	Usable		Common Area		
	3607		636		% of baseline
4 243m²	141,19Kwh/m²		141,19Kwh/m²		100%
	R	1,56/Kwh	R	1,56/Kwh	Total / mnth
	R	794 366	R	140 182	R 934 548
Per Month	R	18,35/m²	R	18,35/m²	

IMPROVEMENTS:

	Usable		Common Area		
	3607		636		% of baseline
4 243m²	69,18Kwh/m²		69,18Kwh/m²		49%
	R	1,56/Kwh	R	1,56/Kwh	Total / mnth
	R	389 239	R	68 689	R 457 928
Per Month	R	8,99/m²	R	8,99/m²	

GCX

ENVIRONMENTAL: ENERGY AUDIT RECOMMENDATIONS

RENTAL SENSITIVITY: 2021 Actuals

Gross Cost of Occupation						
Description	**Baseline**		**Improvement**		**Revised Baseline**	
Rentals (incl Parking)	R	180/m²	R	180/m²	**R**	**189/m²**
Rates and Taxes	R	27/m²	R	27/m²	**R**	**27/m²**
Utilities	R	27/m²	R	27/m²	**R**	**27/m²**
Electricity	R	18/m²	R	9/m²	**R**	**9/m²**
Gross Cost of Occupation	R	252/m²	R	243/m²	**R**	**252/m²**
	100,00%		**96,29%**		**100,00%**	
Reduction			**3,71%**			

Improvement Cost		Baseline Improvement		Per Annum	Years
*	R	1 159 500	R	9,36/m²	R 476 619	2,43

ENVIRONMENTAL: ENERGY AUDIT RECOMMENDATIONS

VALUATION PRINCIPALS: BASED REVISED NOI

	Value (Cap 8.5%)	Value Rate / m²
Value As Is	R 107 822 118	R 25 412
Improvement Value	5 607 287	R 1 322
Value on Completion	R 113 429 405	R 26 733
% Increase	5%	

Spend	Improved Value
R 273/m²	R 1 322/m²

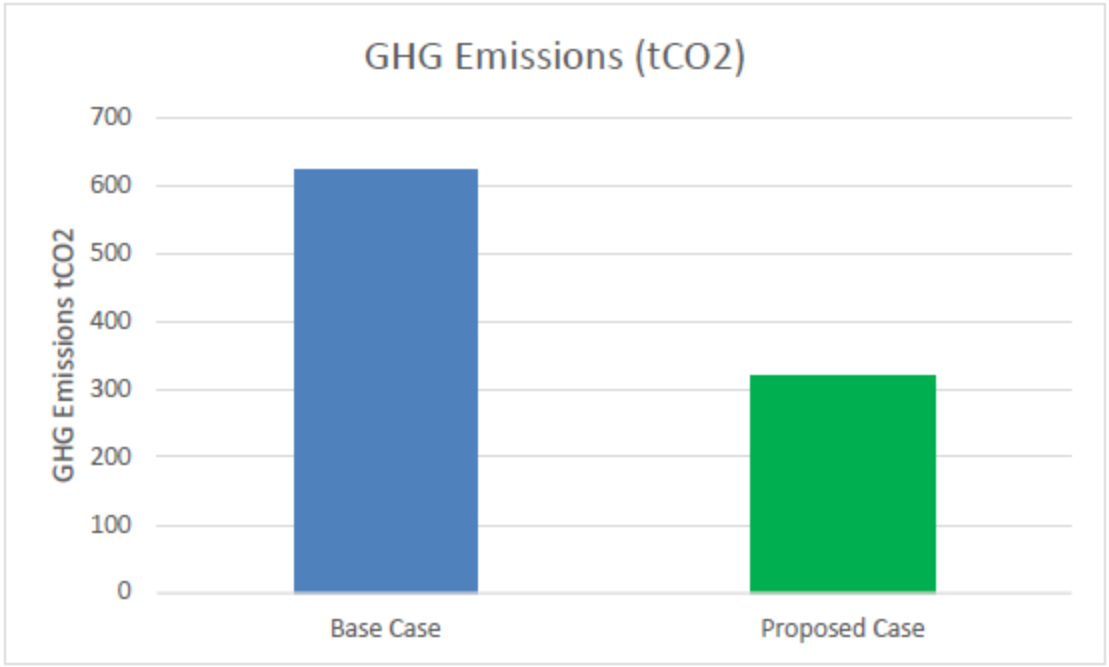
* **Excl 12B & 12L :** Tax Incentives, REIT accessed losses

GCX

ENVIRONMENTAL: GREENHOUSE GAS EMISSIONS

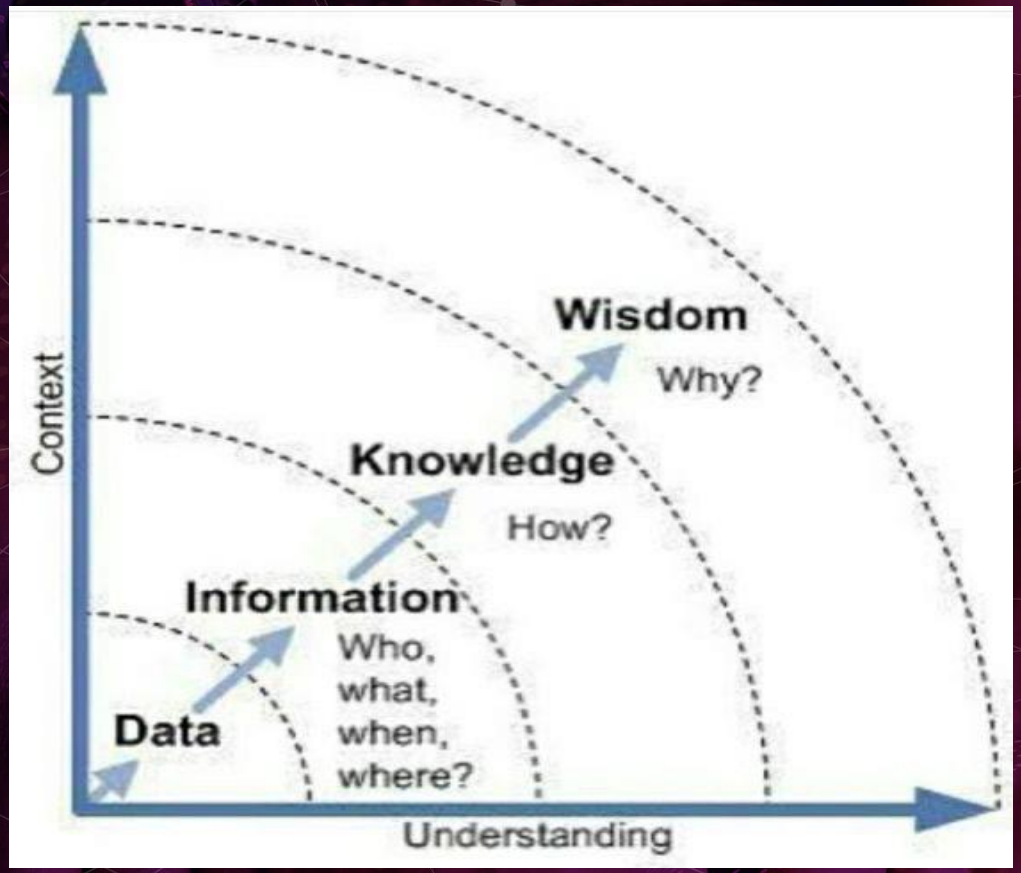
Greenhouse Gas Emissions

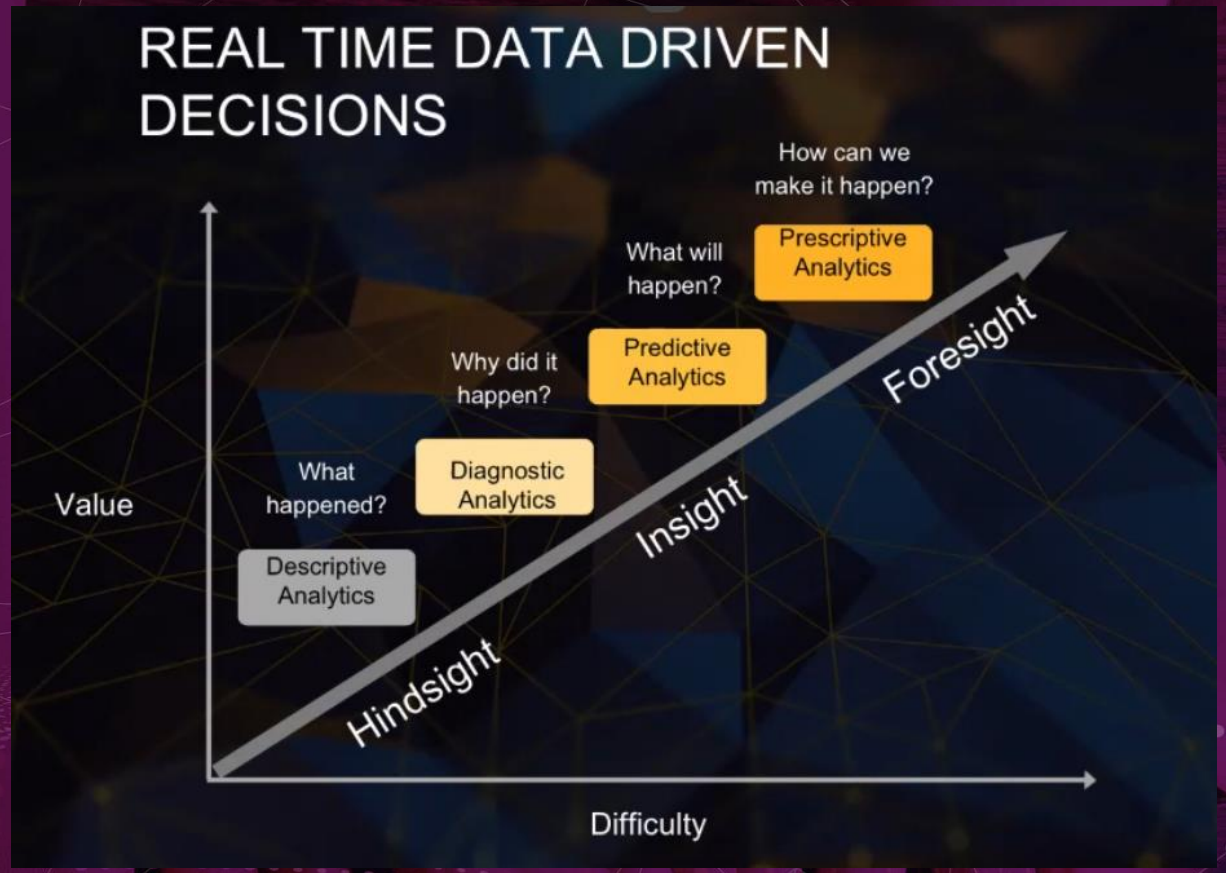
Carbon emissions calculations based on Eskom grid CO_2 emission factors of 1.04 $kgCO_2/kWh$ inclusive of T&D losses.



Net Zero

DATA IS WISDOM: Baseline

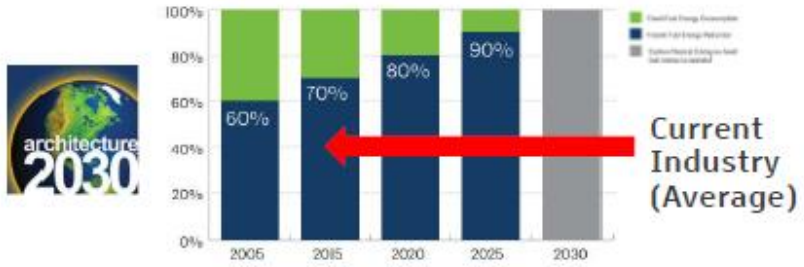




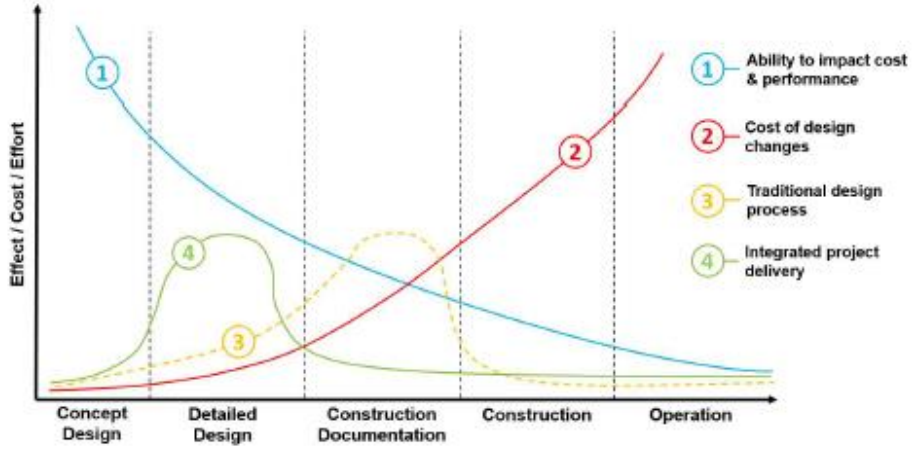
CONSTRUCTION SUSTAINABILITY: Baseline

Why is Insight Important?

BUILDINGS



INTEGRATED DESIGN



i.e. HIGHER PERFORMACE AT LOWER COST

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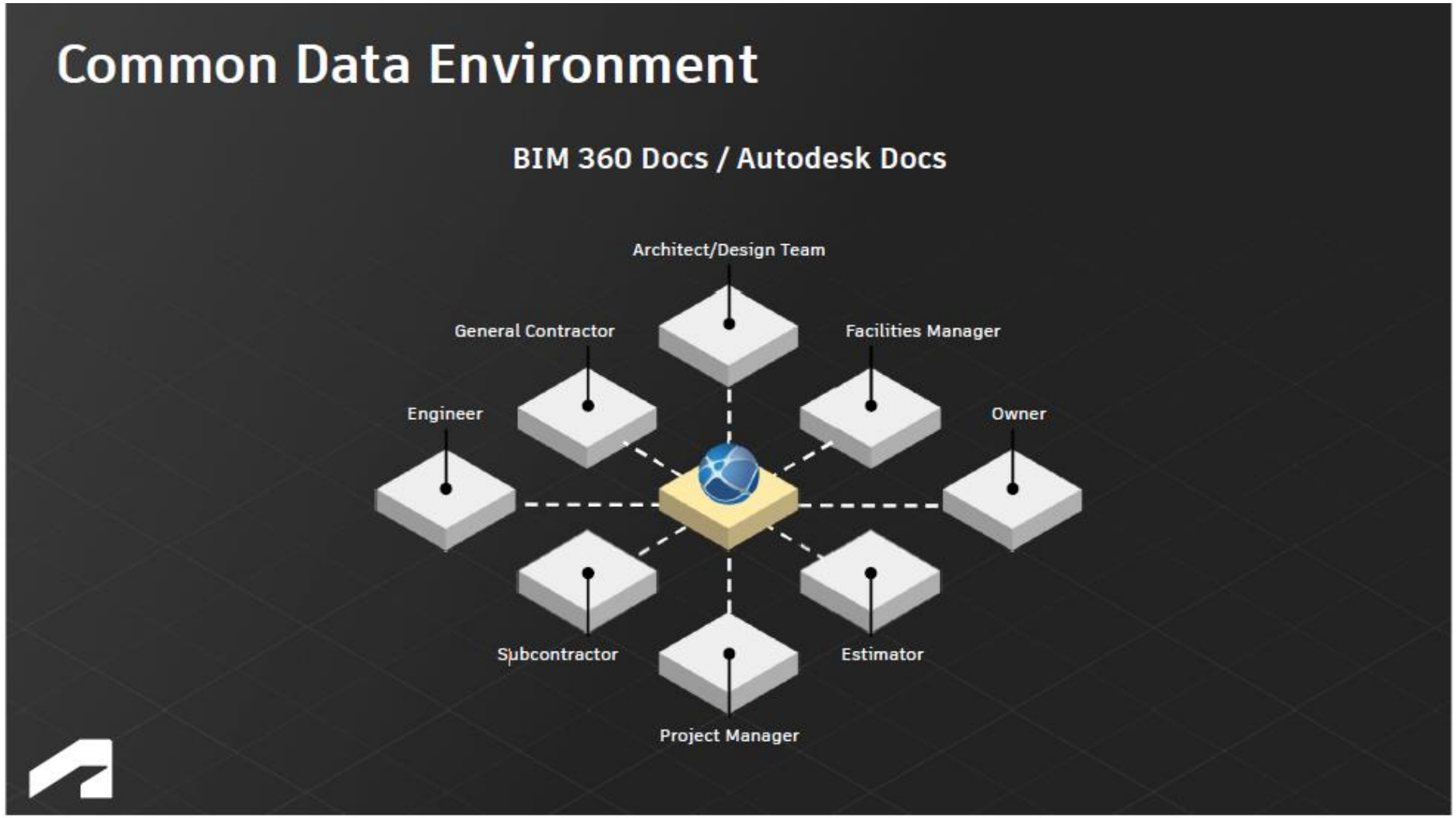
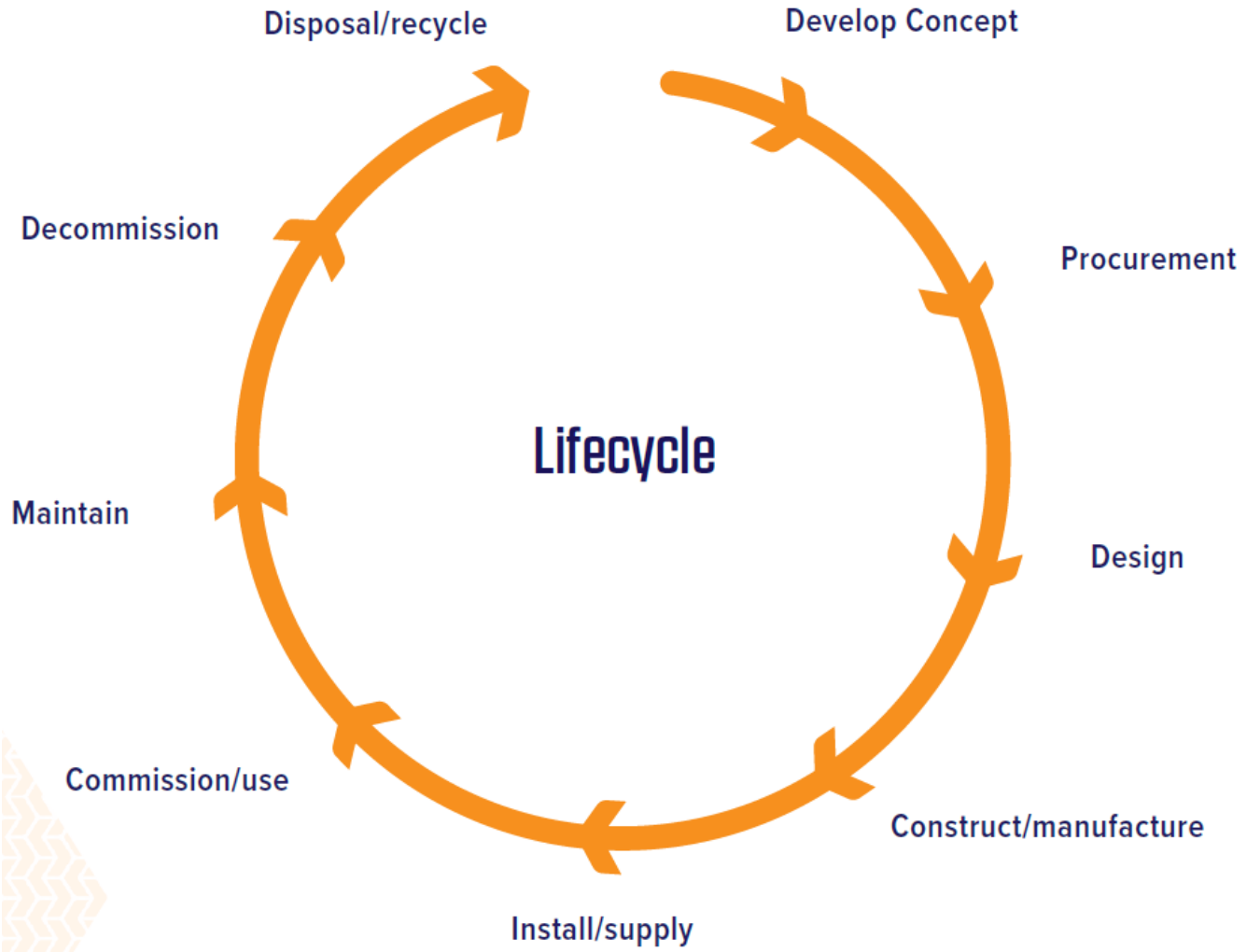
CONSTRUCTION SUSTAINABILITY: Baseline



OPERATIONAL SUSTAINABILITY: Baseline



WHOLE OF LIFE SUSTAINABILITY: Baseline

High Performance Building Design

Lean Construction

Sustainable infrastructure & Cities

WHOLE OF LIFE SUSTAINABILITY: Baseline

The importance of choice of design and construction materials are being highlighted to identify, quantify, and understand the impact of the decision-making process which must aim to influence design decision making processes which in turn will reduce the effect of the construction phase on the environment. Choices of materials also plays a role in the development of urban heat islands in the operational phase, inappropriate decisions here can result in significant environmental impacts such as waste, carbon emissions and pollution.

Embedded Carbon: Business as usual assumed benchmark (2020) 1,000 kgCO2e/m^2

OPERATIONAL SUSTAINABILITY: Baseline

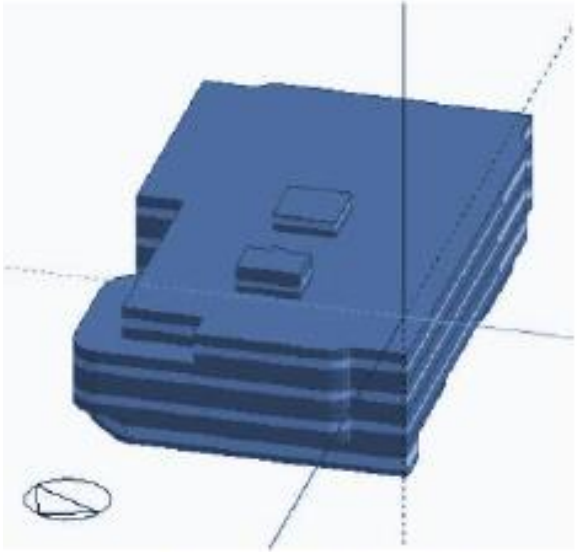


Figure 2 Notional building model

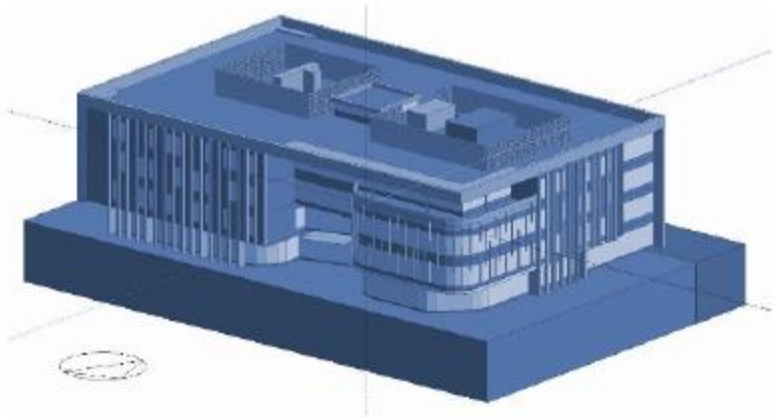
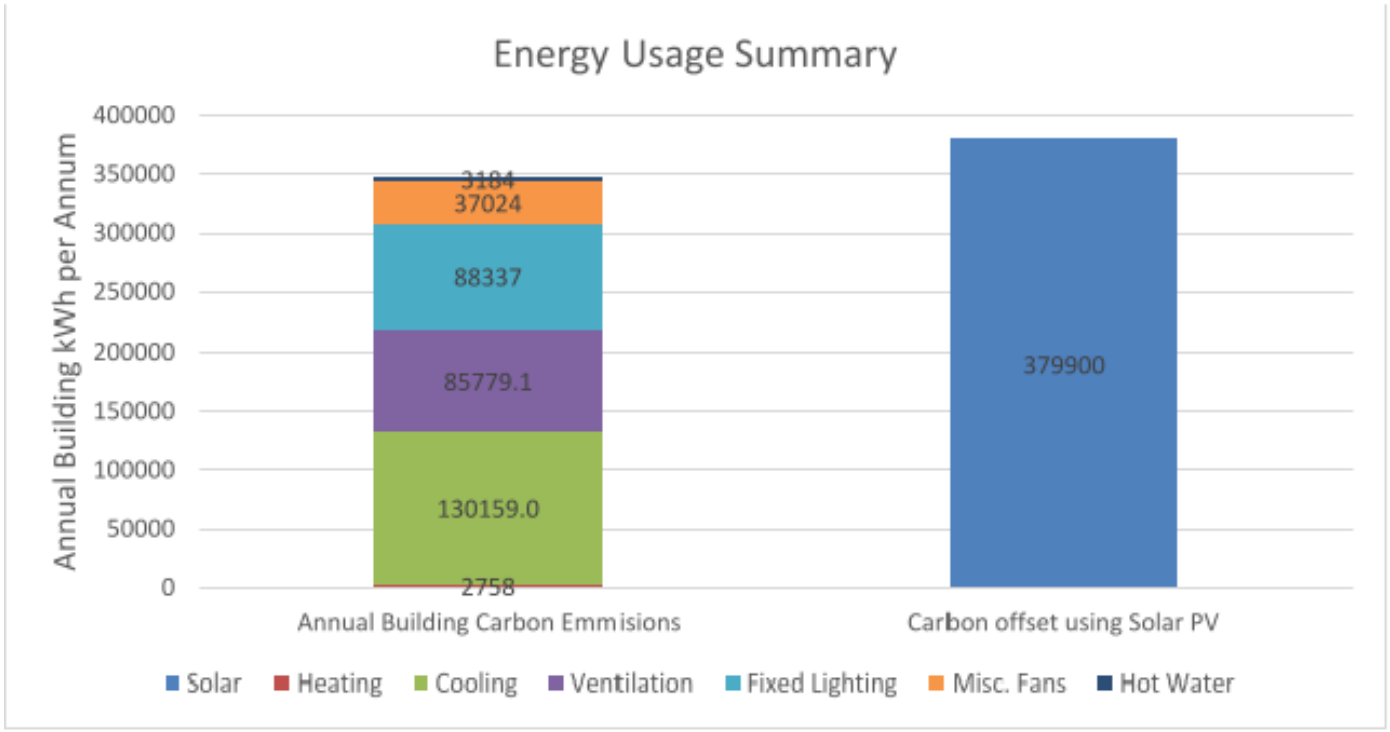
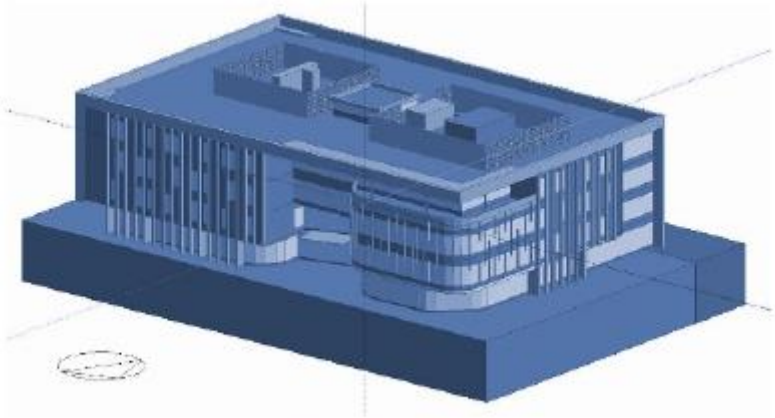


Figure 3 Actual building model

- **Passive design** strategies are features innate to the form and **design** of a **building** that channelise available natural resources to ensure thermal comfort. These climate specific approaches based on sun, wind, light and micro-climatic considerations can be employed to **design** energy efficient **buildings**.
- **U-Ratings & R-Ratings**
- **U = 1 / R**

OPERATIONAL SUSTAINABILITY: Baseline





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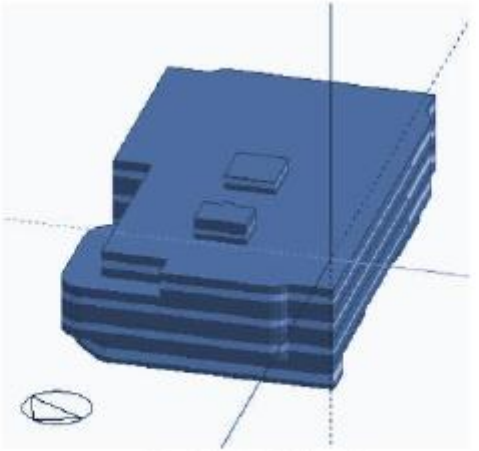

Figure 2 Notional building model

*Lighting number consists of Non-tenant ,Car Park and External lighting as per GSSA Energy calculator for Office v1.1

Energy Use	Solar	Heating	Cooling	Ventilation	Fixed Lighting	Misc. Fans	Hot Water
Annual Building kWh per annum		2758	130159.0	85779.1	88337	37024	3184
Carbon offset using Solar PV	379900						

OPERATIONAL SUSTAINABILITY: Baseline

AUTODESK CONSTRUCTION CLOUD™

	DESIGN	PLAN	BUILD	OPERATE
Capabilities	• Design Authoring • Design Collaboration	• Coordination • Model Conditioning • Quantification • Bid Management • Qualification	• Project Management • Cost Management • Quality • Safety • Project Closeout	• Facilities Maintenance • Asset Lifecycle
Shared Data	Models · Drawings · Issues · Specifications · RFIs · Cost · Assets · As-Builts · Photos · Video			
Insight	Dashboards · Reports · Construction IQ · Data Connector			
Network	Builders Network			

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Annex A
(normative)

Format of the energy performance certificate

This annex provides an example of the EPC. This format is based on the examples given in annex C of EN 15217:2007.

A Government Building
Light House
23 Energy Street
Anytown
12345

Certificate Number 123-456

This certificate is issued in terms of SANS 1544:2014, *Energy performance certificates for buildings*, and indicates how much energy is being used to operate this building. The energy performance of the building is based on measured energy performance and is compared to the maximum energy consumption provided for in SANS 10400 XA.

Energy performance certificate

Very energy efficient

A
B
C
D
E
F
G

Not energy efficient

SANS 10400-XA maximum energy consumption in occupancy class in climatic zone 1

200 kWh/(m²·a)

Energy performance of your building

259 kWh/(m²·a)

Energy excluded (outside net floor area) 73 kWh/m²/a

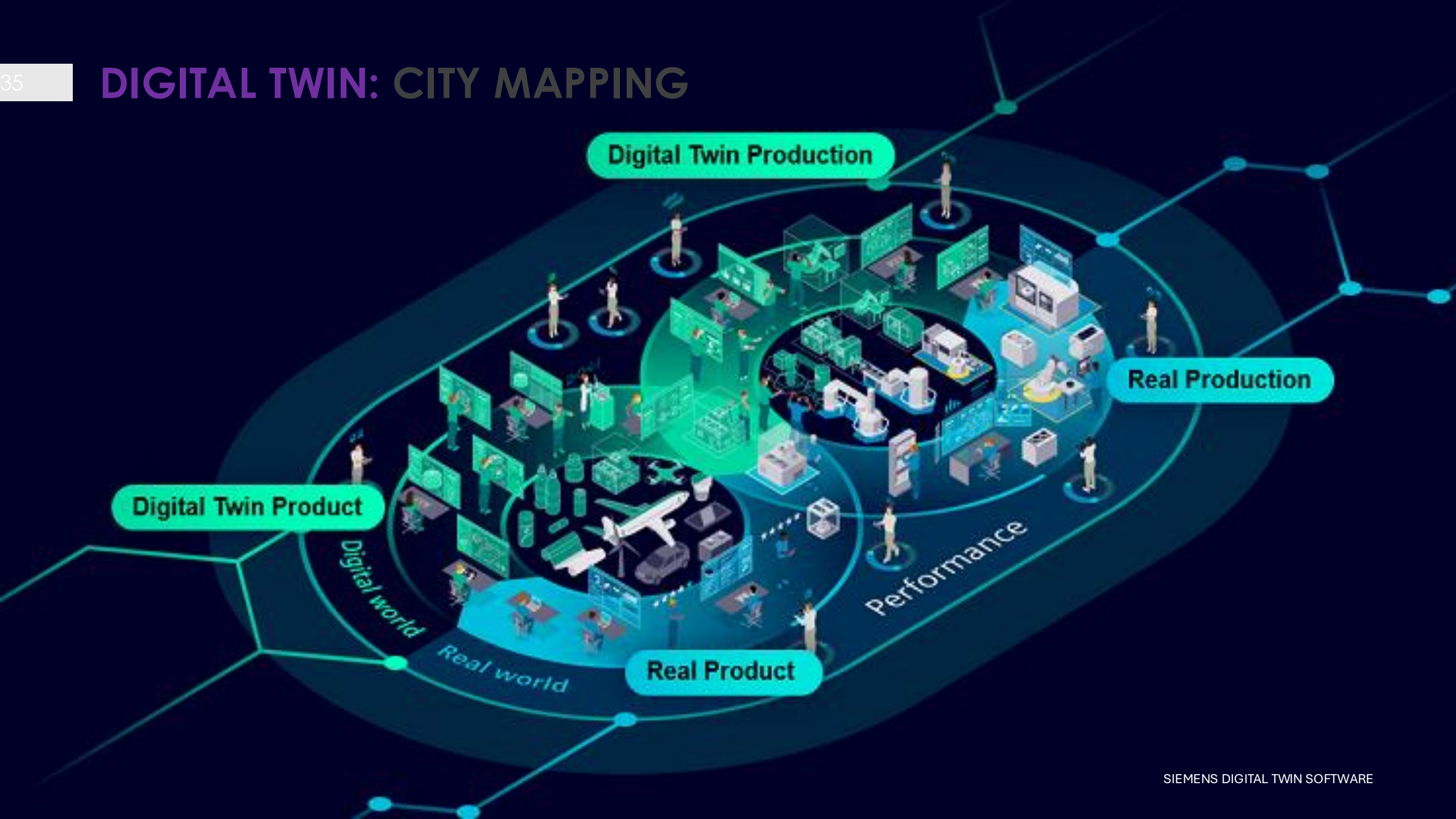
Building information:
Owner: Property Portfolio (Pty) Ltd
Occupancy class/es: G1 – Offices
Number of floors: 12
Net floor area: 2 730 m²
Year of construction: 1955
Building plan approval: 1955/02/21
Occupancy certificate: 1956/05/21
Year of last major renovation: 1999
Climatic zone: 3 – Hot interior
Cadastral information: Erf 3 Farm Soutfontein

Administrative information:
Accredited body: Energy Auditors Inc
Accreditation No. SANAS 98765
Assessor name: AN Assessor
Date of issue: 1 July 2013
Valid until: 31 June 2018

Carrier	From (date)	To (date)	kWh	Net floor area	kWh/m²
Electricity (grid)	2012.01.01	2013.01.01	400 000	1 000	400
Gas					
Other					

ENERGY PERFORMANCE CERTIFICATION

DIGITAL TWIN: CITY MAPPING




kream