



sanedi

South African National Energy
Development Institute

THE ENERGY PERFORMANCE CERTIFICATES (EPCs) REGULATION TRAINING

Presented By

EPC Subprogramme

South African National Energy Development Institute

04 November 2025



CONTENT OUTLINE

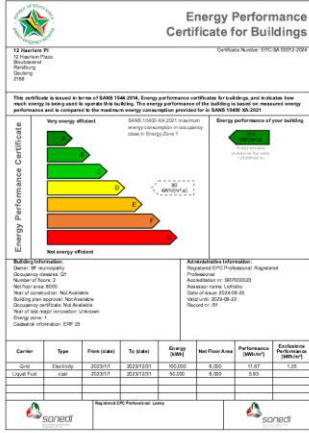
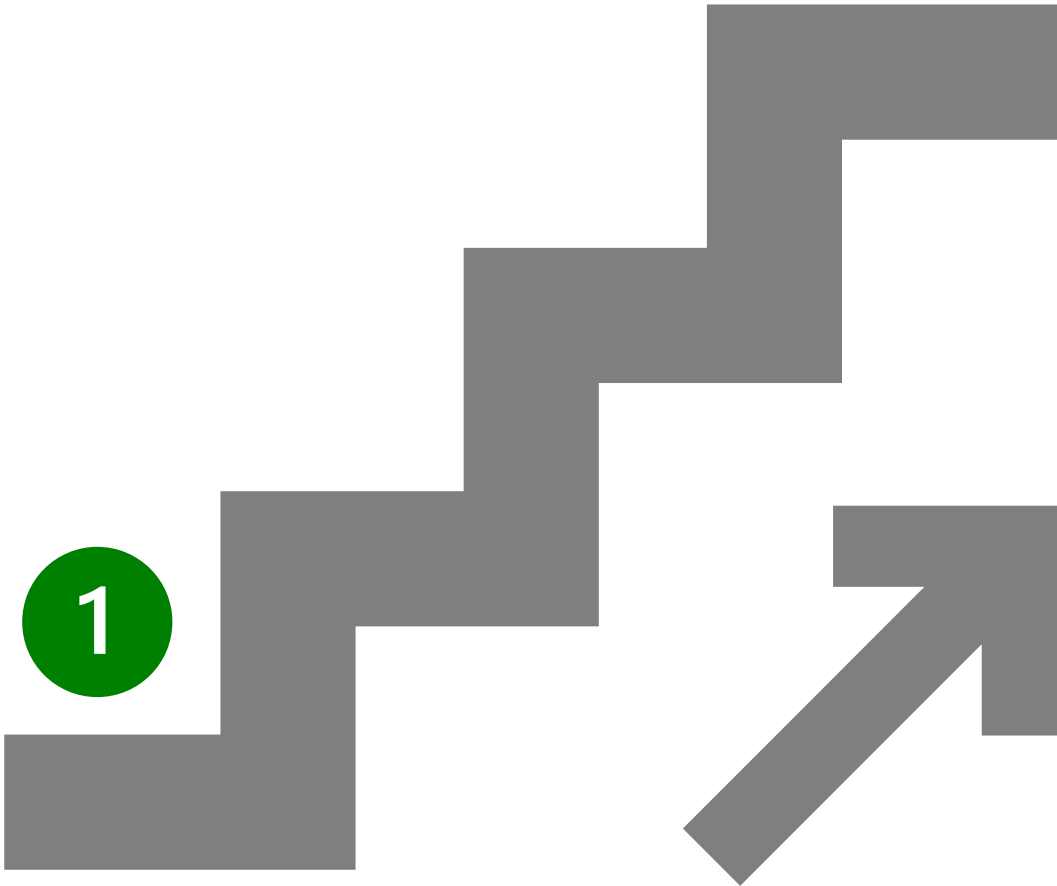
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BACKGROUND ON THE ENERGY PERFORMANCE CERTIFICATE REGULATION



WHY ENERGY PERFORMANCE CERTIFICATES



Why EPCs?

An EPC is an indication of how much energy is being used to operate a building based on certain parameters.

Improve energy performance of existing building stock

Energy Performance Certificate

Can be used as the first step to approach sustainable buildings. EPC provide credible data and benchmarks which can be used for energy efficiency interventions and environmental sustainability

“You cannot manage what you have not measured”



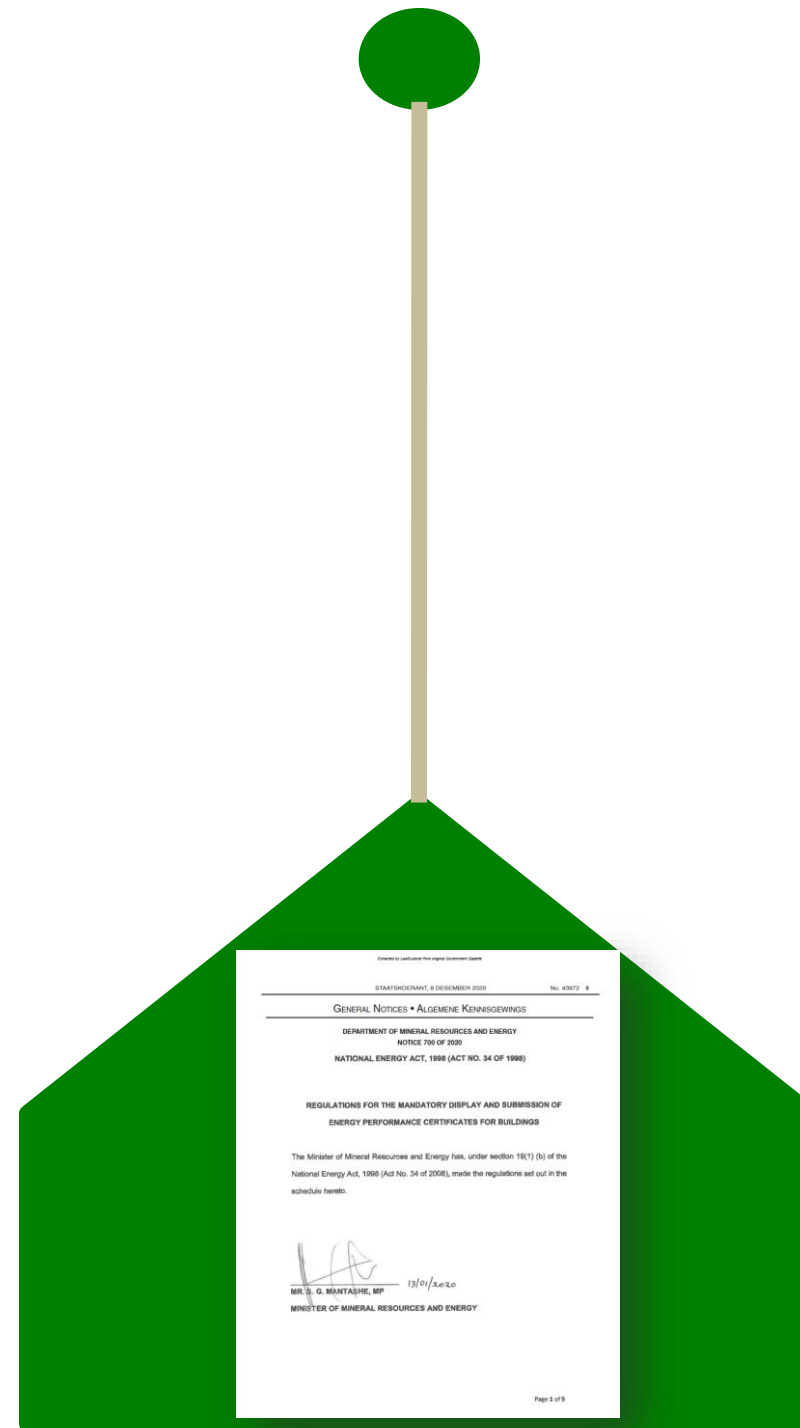
IMPLEMENTATION IN SA THROUGH POLICY

Energy Performance Certificates Regulatory Framework



- EPC Regulation
- Registration of Quality Assurers
- EPC Compliance Monitoring
- Stakeholder Engagements

- Implementation of the EPC Regulation
- Hosts & Maintains the NBEP Register
- Registration of EPC Professionals
- Stakeholder Engagements



THE EPC REGULATION BACKGROUND



Regulation

Promulgated under the National Energy Act of 1998 (Act No. 34 of 2008).

Mandatory display and submission of Energy Performance Certificates (EPCs)

Mandated for privately owned buildings with a net floor area greater than 2000 m² and 1000 m² for publicly owned buildings.

Amendment Regulation introducing compulsory registration of buildings

Revision of definition for Energy Performance Certificates to a certificate issued by an accredited body prior to 31 July 2024 and thereafter by a registered professional



Application

Mandated occupancy classes,

A1 – Entertainment & Public Assembly;

A2 - Theatrical & Indoor Sport;

A3 – Places of Instruction

G1 – Offices

Building must be in operation for two years and without major renovations

Building owners and accounting officers must **register** the type and size of their building/s onto the National Building Energy Performance Register which is available online.



Parameters

Failure to comply will be met by prosecution with fines of up to 5 million Rand.

OR

imprisonment for up to 5 years
OR

both fine and imprisonment

Deadline for compulsory registration of type and size of buildings is **2 Aug 2024**

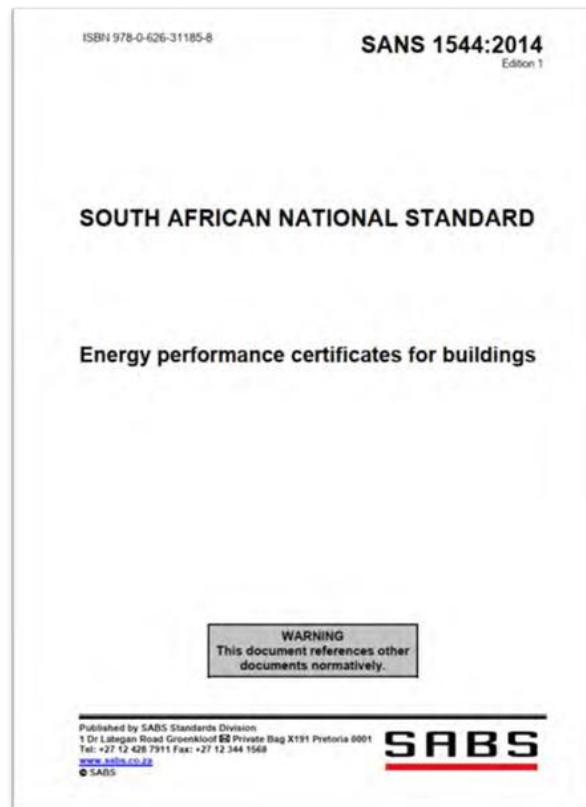
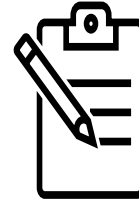
Deadline to compliance for Energy Performance Certificates is **7 December 2025**

Renewal of EPCs is every 5 years



EPC STANDARDS

SANS 1544:2014

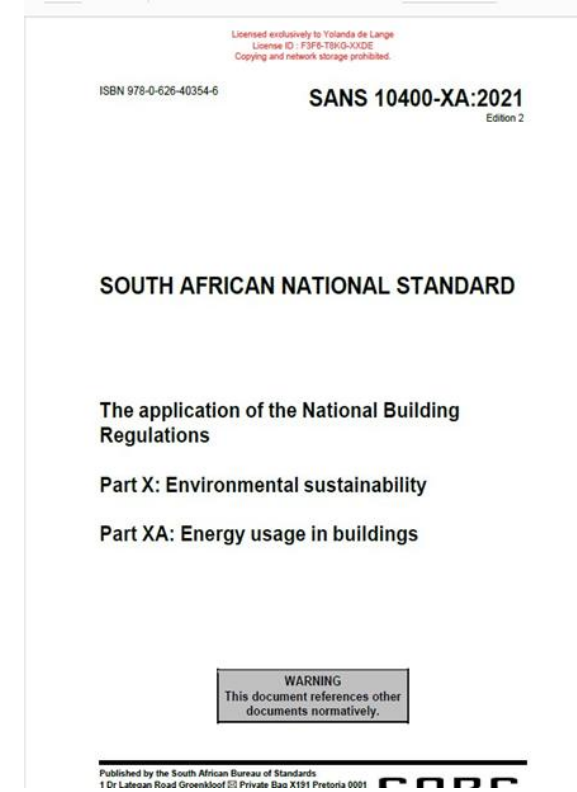
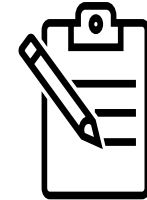


Specifies the requirements for producing EPCs for buildings



Includes specifications for the format of the EPC

SANS 10400-XA:2021



Specifies the minimum requirements for efficiency



Specifies the environmental sustainability in building design



BUILDINGS THAT THE REGULATION APPLIES TO



A1: Entertainment &
Public Assembly

- Restaurant
- Hall



A2: Theatrical &
Indoor Sports

- Theatre
- Cinema



A3: Places of
Instruction

- Universities
- Primary Schools



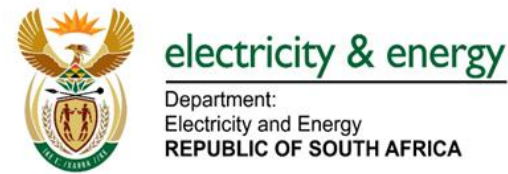
G1: Offices

- Large Office
- Stand alone blocks

Note: Not Applicable to Residential Buildings



KEY STAKEHOLDERS



Quality Assurers

Registered Professionals
from 01 August 2024

Building owners and
Accounting Officers

DEE is responsible for:
EPC Regulation,
Registration of
Quality Assurers,
and compliance
monitoring.



SANEDI is responsible for:
Hosting and
Maintaining the
NBEPR.
Registering of EPC
Professionals

SABS is responsible for:

The development of
standards used for
Energy Performance
Certificates, namely
SANS 1544:2014 and
SANS 10400XA:2021

QAs are responsible for:

According to ISO 17020
and the DEE/SANEDI
QMS:

Quality Assurers are
responsible for assuring
the work done by the
registered professionals
aligns with Regulation
and SANS 1544:2014

**According to the
Amendment
Regulation Notice
1937 of 2023:**

a Registered
Professional means an
individual professional
registered by the South
African National Energy
Development institute
(SANEDI). Responsible
for collecting energy
data and the issuance of
EPCs to building
owners.

**Accounting officers
and building
owners are
responsible for:**

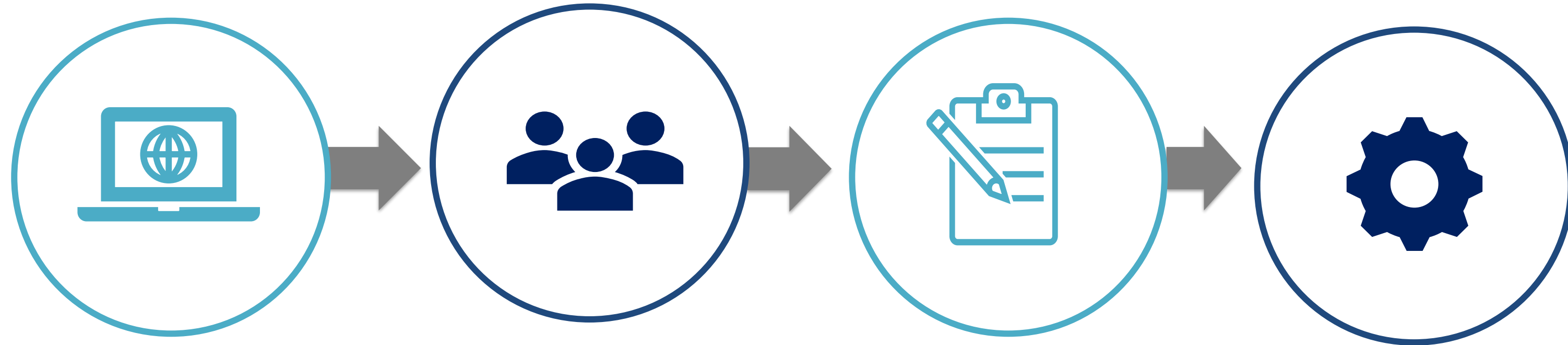
Registering the size
and type of their
buildings onto
the NBEPR
Complying to the
mandatory display of
an EPC at the entrance
of their buildings.



THE ENERGY PERFORMANCE CERTIFICATES PROCESSES



BUILDING REGISTRATION PROCESS



Step 1

A building owner/accounting officer will use the registration link on SANEDI's website to register their profiles.

Step 2

The building owner/accounting officer must register the type, size, and energy consumption of their building onto the NBEPR

Step 3

The online system will verify and issue a unique registration number to the building owner

Step 4

The building owner/accounting officer shall select a suitable registered professional to continue with EPC application process

Link: <https://epc.sanedi.org.za/login>



APPLICATION PROCESS FOR ISSUING EPCS

1. Building Registration

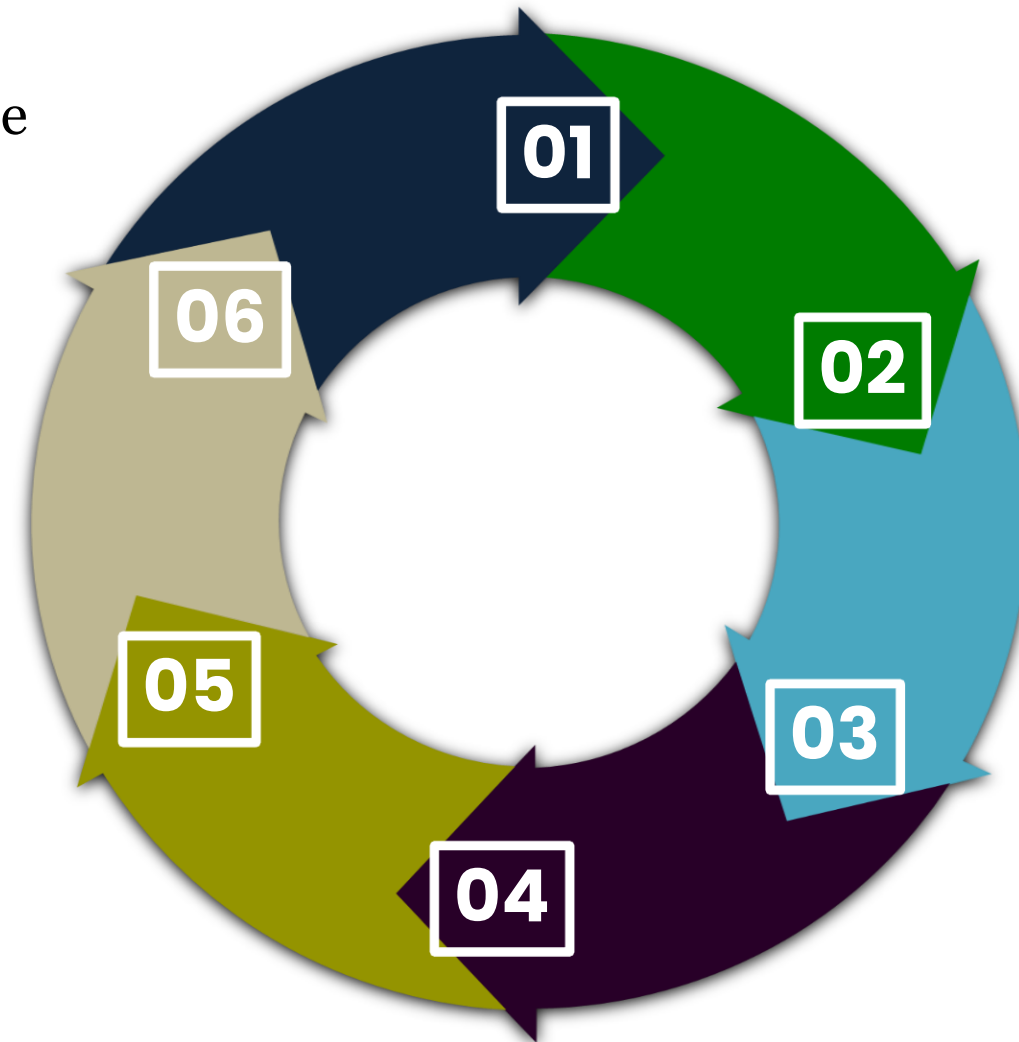
Compulsory registration of type and size of mandated buildings on NBEPR.

6. Renewal Reminders

Initial renewal reminders to be sent in Year 3 and final reminders in Year 4.

5. DEE Compliance Audits

DEE to appoint Quality Assurers and commission compliance audits.



2. EPA in Line SANS 1544:2014

Appoint registered EPC professional to conduct assessment in line with SANS 1544:2014

3. The NBEPR & EPC Data

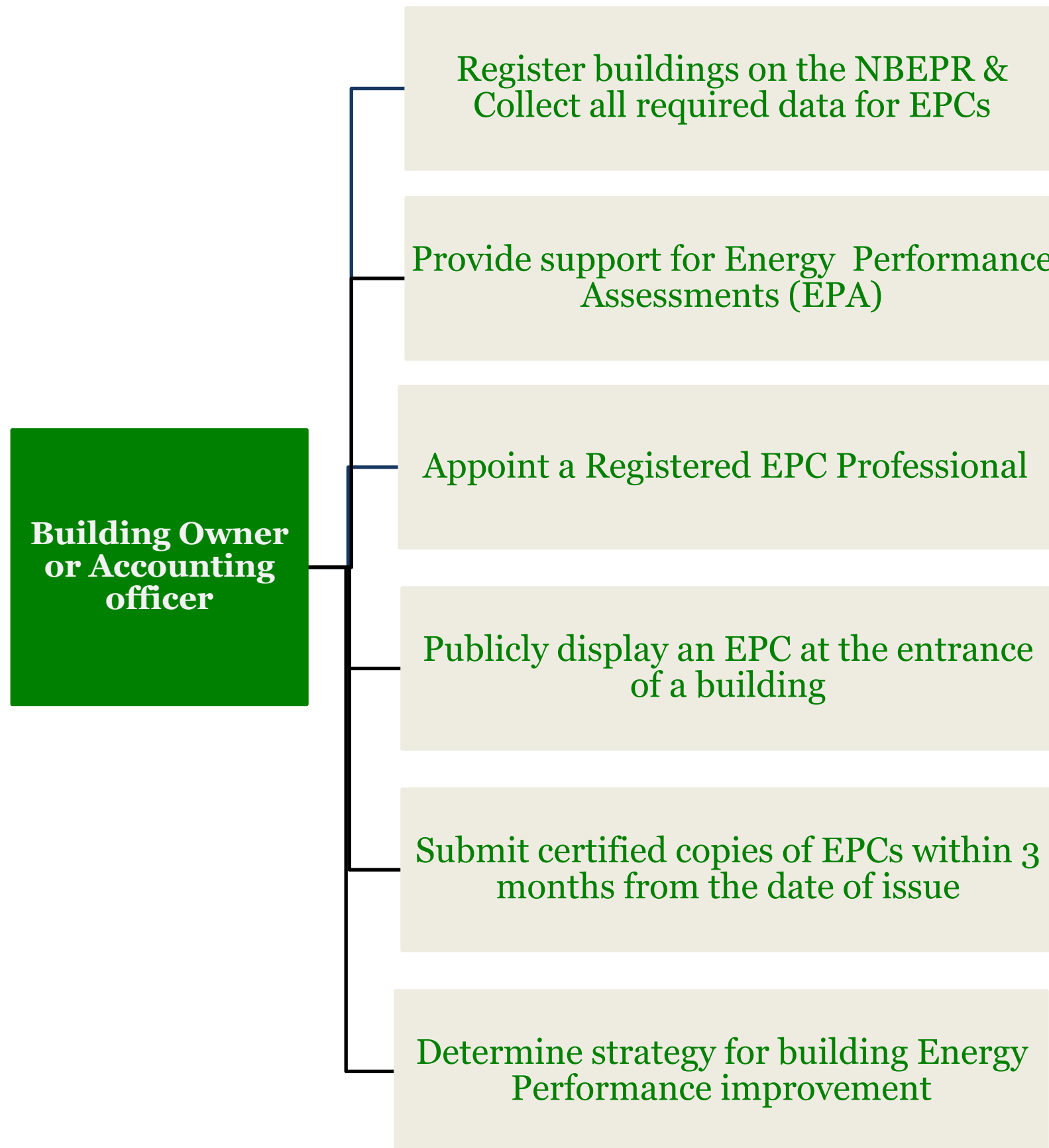
Upload all collected and analysed data onto the NBEPR for the issuance of certificate.

4. Display and Submit EPC

Building owner must publicly display certificate at entrance of buildings and submit a certified copy to SANEDI



RESPONSIBILITIES OF A BUILDING OWNER

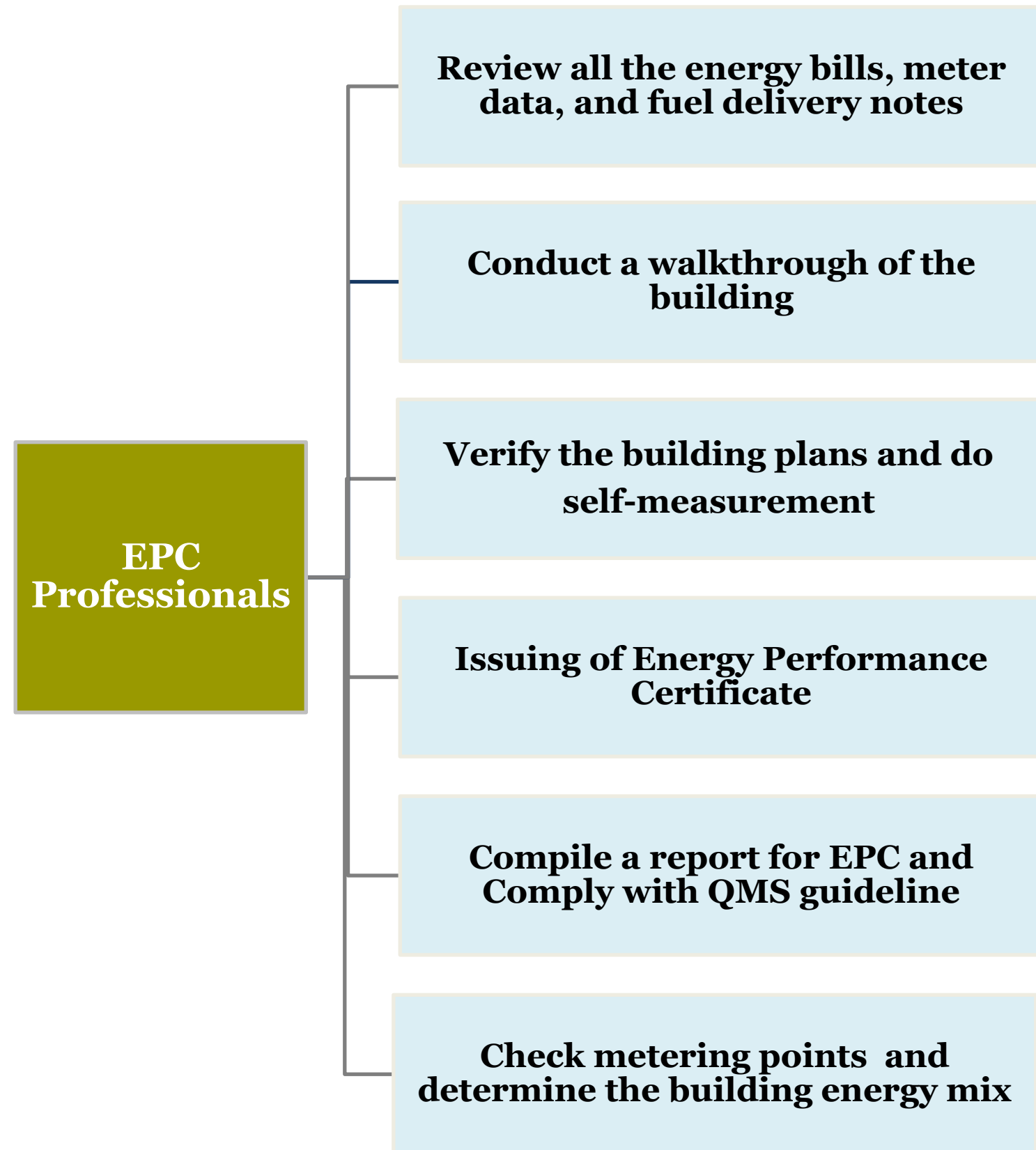


Link to find a professional:
<https://epc.sanedi.org.za/sanas-bodies>

The availability of data can help reduce the cost of EPC.




DUTIES OF EPC PROFESSIONALS



EPCs must be issued in accordance with SANS 1544:2024



DETAILS ON ENERGY PERFORMANCE CERTIFICATE



12

Energy Performance Certificate for Buildings

12 Haerlem PI
12 Haerlem Place
Boubostrand
Randburg
Gauteng
2188

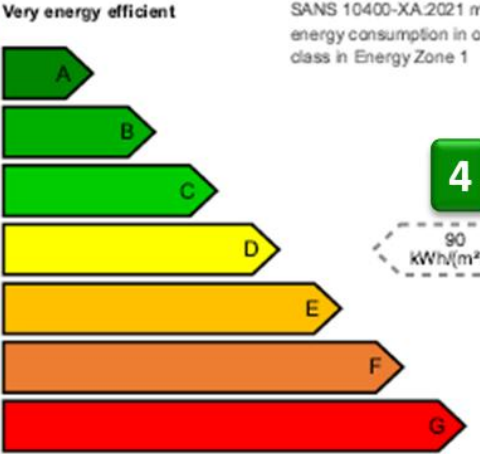
Certificate Number: EPC-SA 00012-2024

1

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:2021

Energy Performance Certificate

3



4
90 kWh/(m².a)

Very energy efficient

SANS 10400-XA:2021 maximum energy consumption in occupancy class in Energy Zone 1

5

17.5 kWh/(m².a)

Energy excluded (outside net floor area) 1.25 kWh/(m².a)

Energy performance of your building

Not energy efficient

Building Information:


Owner: BF municipality
Occupancy class/es: G1
Number of floors: 2
Net floor area: 8000
Year of construction: Not Available
Building plan approval: Not Available
Occupancy certificate: Not Available
Year of last major renovation: Unknown
Energy zone: 1
Cadastral information: ERF 23

Administrative Information:

Registered EPC Professional: Registered Professional
Accreditation nr: SRP000023
Assessor name: Lethabo
Date of issue: 2024-08-23
Valid until: 2029-08-22
Record nr: R1

8	Carrier	Type	From (date)	To (date)	Energy [kWh]	Net Floor Area	Performance [kWh/m²]	Exclusions Performance [kWh/m²]
	Grid	Electricity	2023/1/1	2023/12/31	100,000	8,000	11.67	1.25
	Liquid Fuel	coal	2023/1/1	2023/12/31	50,000	8,000	5.83	


9



Registered EPC Professional: Lesley

10

11



1. Unique Energy Performance Certificate Number
2. Physical Address of the Building
3. Energy Performance Scale (Energy Efficiency Label)
4. Benchmark (SANS 10400-XA 2021)
5. Building's Measured Energy Performance
6. Building's Information
7. Administrative Information
8. Types of Energy Carriers and Building Performance
9. Registered EPC Professional Logo
10. Registered EPC Professional
11. SANEDI Logo
12. Energy Efficiency Logo



LANDSCAPE OF IMPLEMENTATION



DASHBOARD

8103

Building Registered

4425

EPCs Issued to Date

3264

Certified Copies Submitted

81

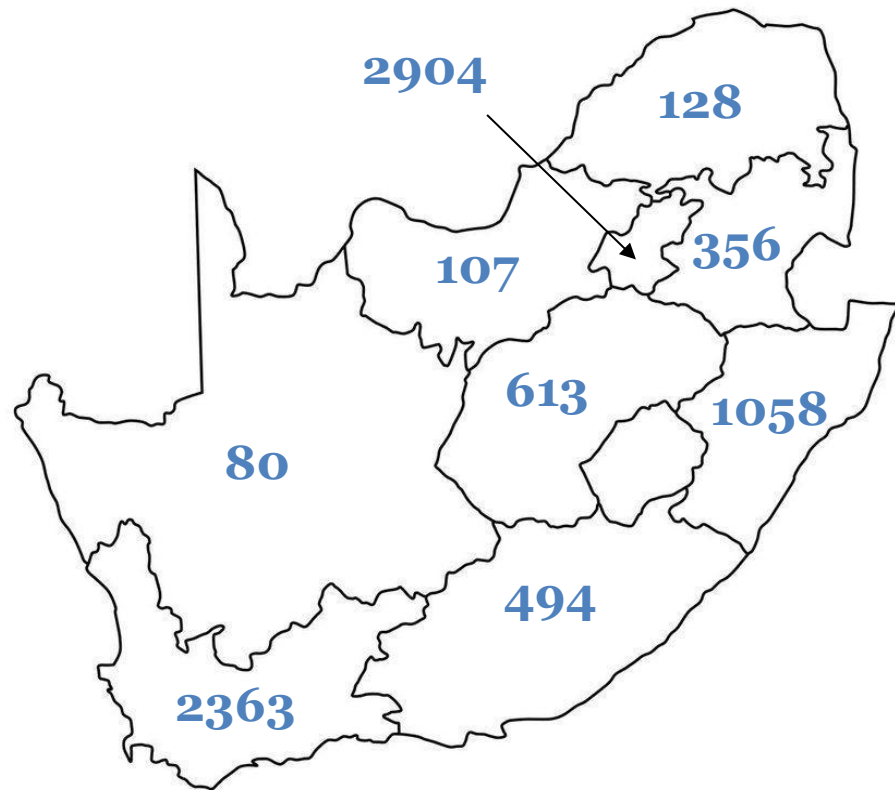
Registered EPC Professionals

4457

**Total Consumption
Baseline (GWh)**

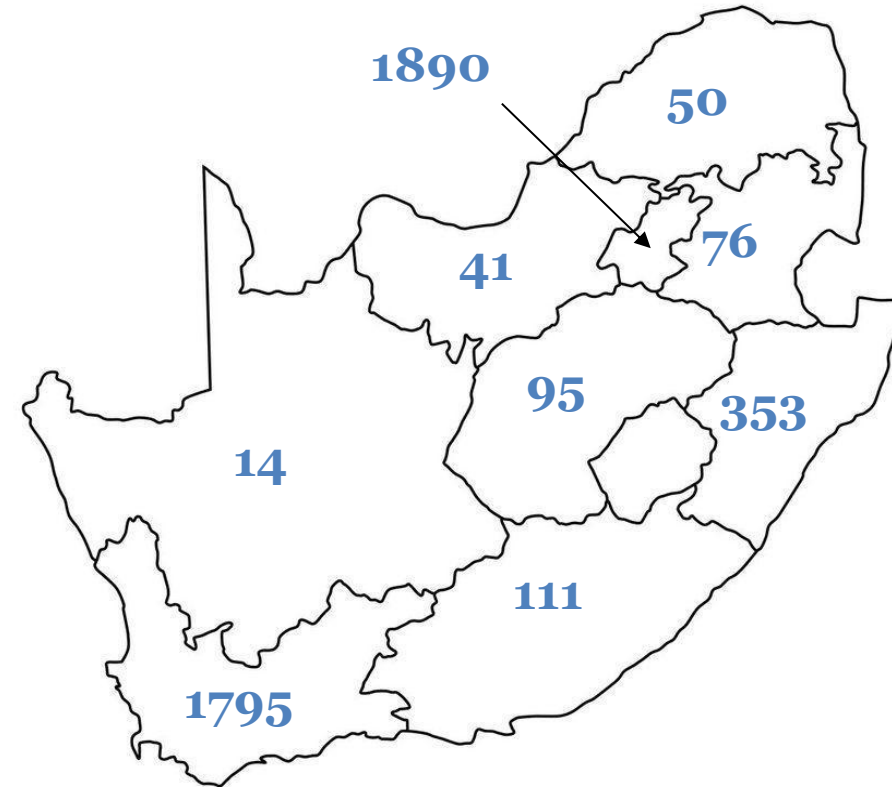
Provincial Footprint

(Building Registered)

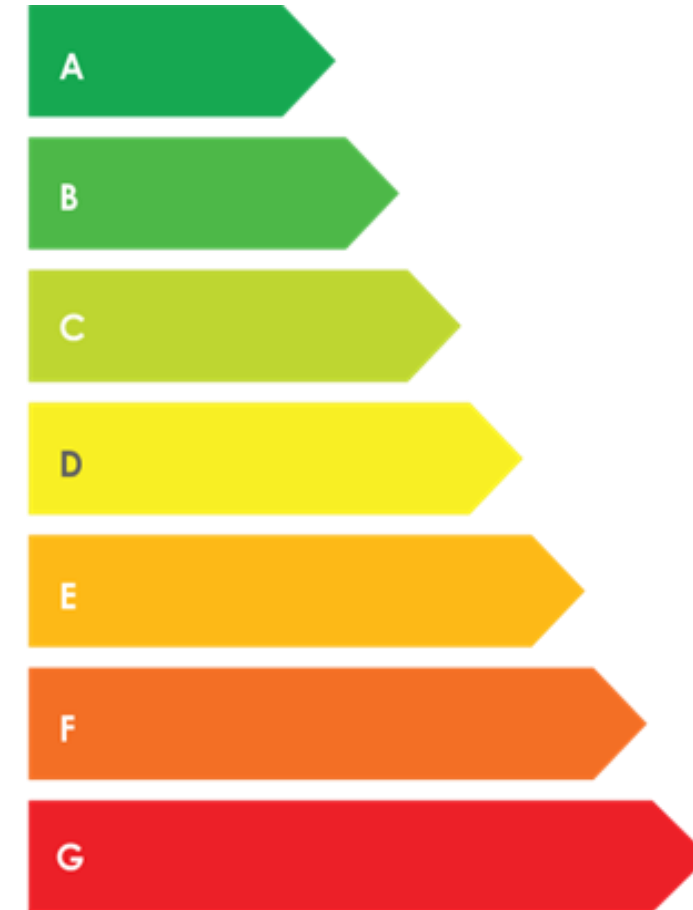


Provincial Footprint

(Building Issued with EPCs)



Performance Scale



Consumption Baseline

89 GWh

301 GWh

484 GWh

260 GWh

414 GWh

450 GWh

2459 GWh



DATA ANALYSIS_CALCULATIONS



WHY ENERGY AUDITS?

An **Energy Audit** is a systematic analysis of energy use and energy consumption within defined audit scope in order to identify, quantify, and report on the opportunities for improved energy performance.

Four aspects to be considered when conducting energy audit:

- **How** and **where** energy enters the building
- The **path** of the energy and **how** it is used
- The difference between **inputs** and **uses**
- How the **energy efficiency** can be **improved**

The Purpose of Energy Audits

Reducing Energy costs for building owners by implementing energy efficient measures.

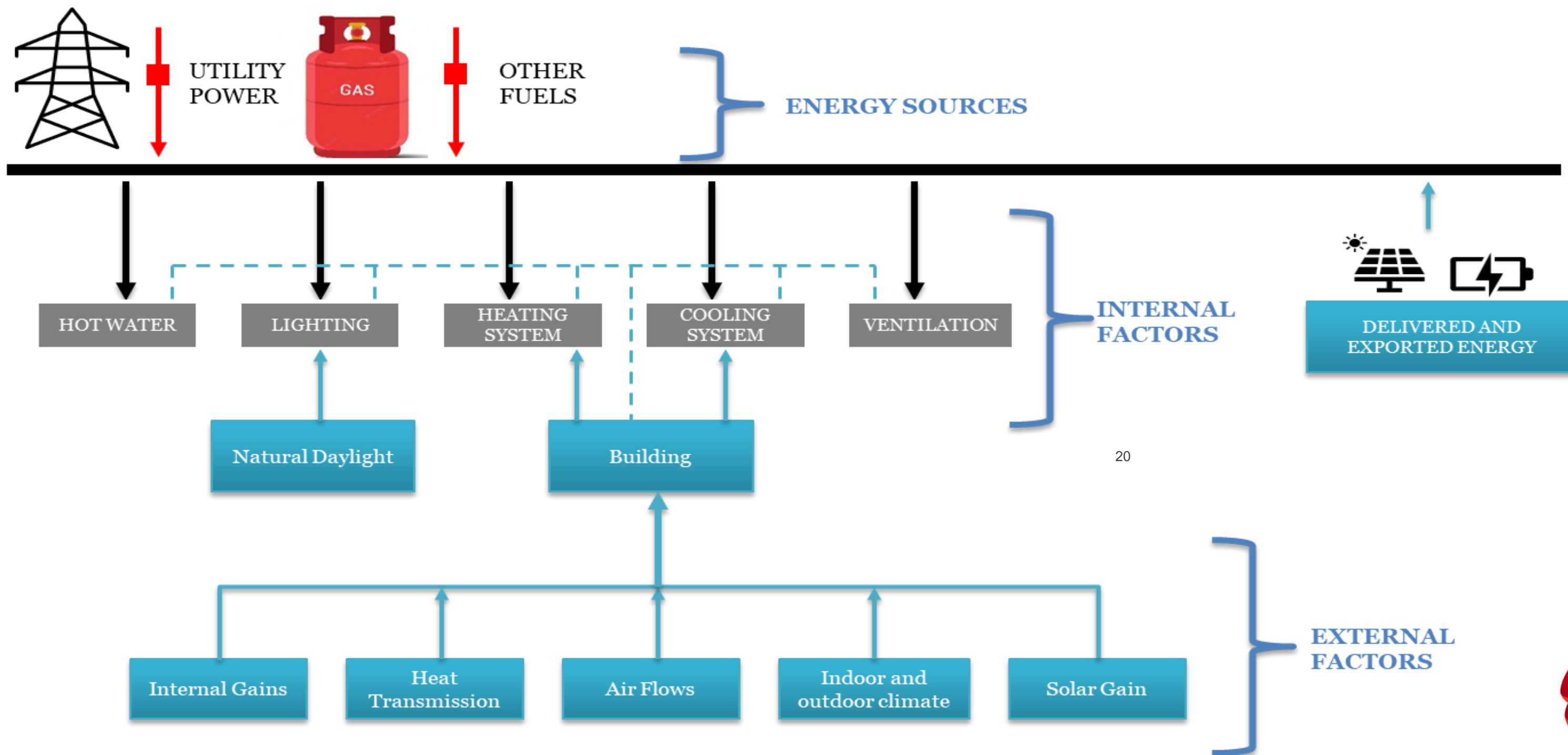
To identify energy concerns with regards to electrical systems and ventilation.

Reduce carbon emissions and contribute to green building initiatives.



FACTORS THAT DETERMINE A BUILDING'S ENERGY PERFORMANCE

The energy performance of the building is based on annual measured energy consumption per square meter to meet the different needs associated with use of the building. Energy performance is affected by how energy is being used to operate the building.



20



REQUIRED INFORMATION

1

Energy Consumption data

- 12 Months Energy Data in kWh
- Identify all energy sources of the building (Solar PV, Electricity, Liquid Fuel)
- Energy Consumption can be obtained from the following:
 1. Energy Bills
 2. Invoices
 3. Meters

2

Building Information

- Building Floor Plans (Net floor areas, total floor areas)
- Identify Unoccupied Areas (Vacant Areas)
- Identify Exclusion Areas (Store rooms, Basement Parking, garages)
- Building Address and location
- Number of floors

3

Occupancy Information

- Occupancy Certificate
- Operational Hours of the building
- Year of major renovations
- Occupancy rate
- Type of occupancy (Single or Multiple occupancy)
- Occupancy class (A1, A2, A3, G1)



NET FLOOR AREA & EPC CALCULATIONS



Net floor area: sum of all areas between the vertical building components (walls or partitions), excluding garages, car parks and storerooms

BEP = Net energy consumption/Net floor area

Multiple of Reference value = BEP/Benchmark

Unoccupied Areas: Area that is not being used and that is not consuming energy



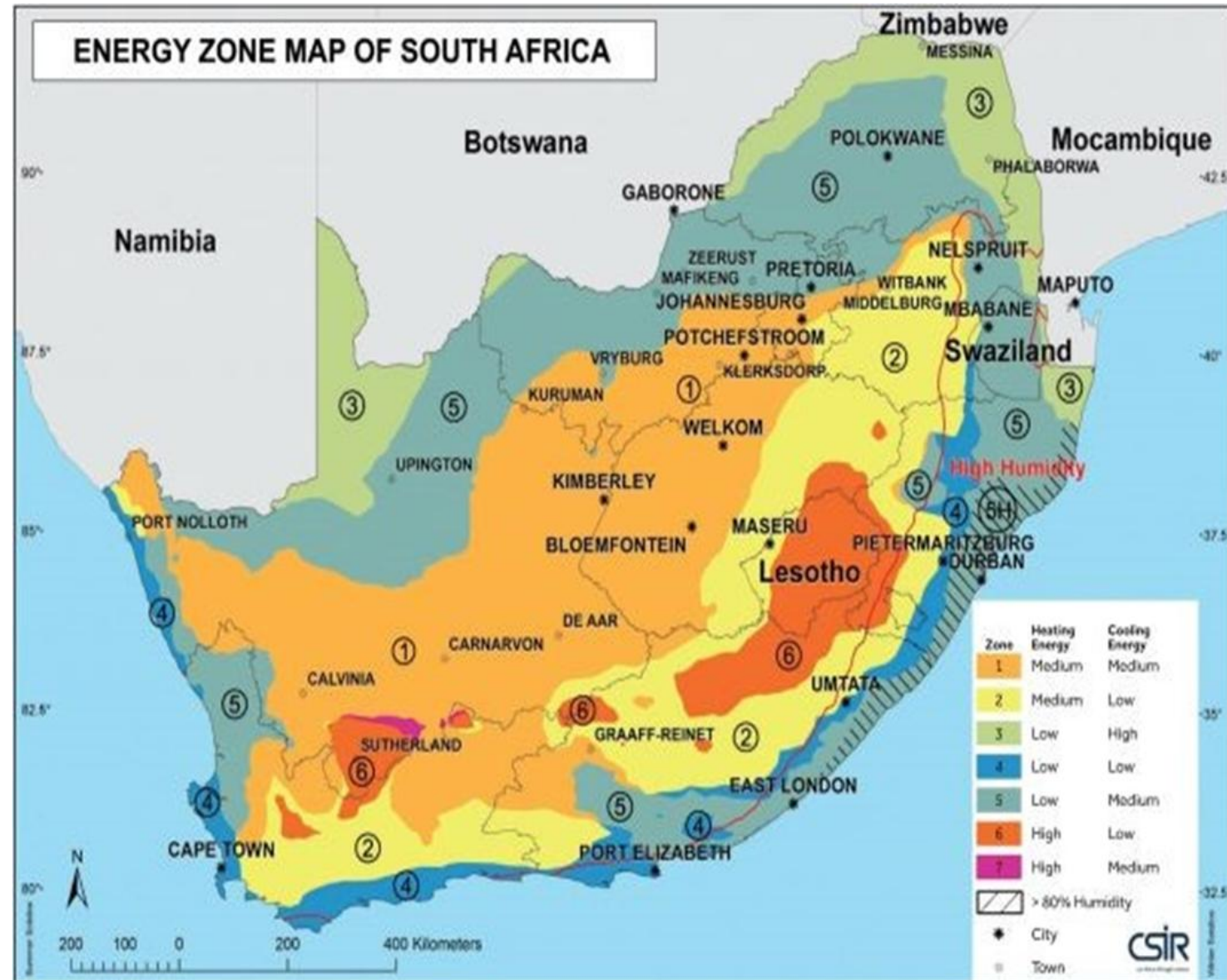
For EPCs we look at the usable internal area (net floor area) and issue an EPC per building.

Occupancy Rate: actual operating hours compared with normal operation hours of the building.



ENERGY ZONES & BENCHMARK CALCULATIONS

Energy zone is determined by the **location** of the building using the map from **(SANS 10400XA:2021)**



Benchmark is determined by the **energy zone** and the **occupancy class** of the building **(SANS 10400XA:2021)**

Table 1 — Maximum annual energy consumption per building classification for each energy zone (kWh/m²/a) (Energy zones as shown in figure 1 and annex C)

Class of occupancy	Energy zones							
	1	2	3	4	5	5H	6	7
A1 Entertainment and public assembly Occupancy where persons gather to eat, drink, dance or participate in other recreation.	75	75	95	70	95	95	80	80
A2 Theatrical and indoor sport Occupancy where persons gather for the viewing of theatrical, operatic, orchestral, choral, cinematographical or sport performances.	95	95	110	90	110	110	105	105
A3 Places of instruction Occupancy other than primary or secondary schools, where students or other persons assemble for the purpose of tuition or learning.	110	155	110	125	140	140	120	120
A3 Places of instruction Occupancy where school children assemble for the purpose of tuition or learning	60	65	55	60	55	60	65	65
A4 Worship Occupancy where persons assemble for the purpose of worshipping.	70	45	45	40	50	40	70	70
G1 Offices Large multi-storey office buildings, banks, consulting rooms and similar uses with lifts and energy consuming services that operate on a typical daytime occupancy.	90	105	110	95	110	95	100	100
G1 Offices Stand-alone blocks and / or campus of buildings that form an office park but operate separately	70	150	190	145	180	165	75	75

A CASE STUDY – BUILDING X



PROFILE OF BUILDING X – SINGLE OCCUPANCY

Size of Building:	15,000 m ²
Occupancy Class:	G1 – Offices
Ownership:	Private
Location:	Sandton, Johannesburg
Occupancy Rate:	100%
Excluded Area:	5,000 m ²
Energy Sources:	Electricity = 1,500,000 KWh Diesel = 500,000 KWh Solar PV = 1,000,000 KWh
Energy Consumption in Excluded Area	250,000 KWh
Assessment Period:	01 January 2022 – 31 December 2022



EP ASSESSMENT FOR BUILDING X (1/2)

Total energy consumption- is the total energy consumed by the building for the period of 12 months

$$\begin{aligned}\text{Total Energy Consumption/annum} &= \text{Electricity} + \text{Diesel} + \text{Solar PV} \\ &= 1,500,000 + 500,000 + 1,000,000 \\ &= \mathbf{3,000,000\text{KWh/a}}\end{aligned}$$

$$\begin{aligned}\text{Net Energy Consumption/annum} &= \text{Total Energy Consumption} - \text{Energy Consumption in Excluded Area} \\ &= 3,000,000 - 250,000 \\ &= \mathbf{2,750,000\text{ KWh/a}}\end{aligned}$$

$$\begin{aligned}\text{Occupied Net Floor Area} &= \text{Occupancy Rate} \times (\text{Total Floor Area} - \text{Excluded Area}) \\ &= 100\% \times (15,0000 - 5,000) \\ &= \mathbf{10,000\text{ m}^2}\end{aligned}$$

Benchmark = 90 kWh/m²/a *Determined by the Energy Zone (Location) and Occupancy Class

$$\begin{aligned}\text{BEP} &= \frac{\text{Net Energy Consumption}}{\text{Occupied Net Floor Area}} \\ &= \frac{2,750,000\text{ kWh/a}}{10,000\text{m}^2} \\ &= \mathbf{275\text{ kWh/m}^2/\text{a}}\end{aligned}$$



EPC ASSESSMENT FOR BUILDING X (2/2)

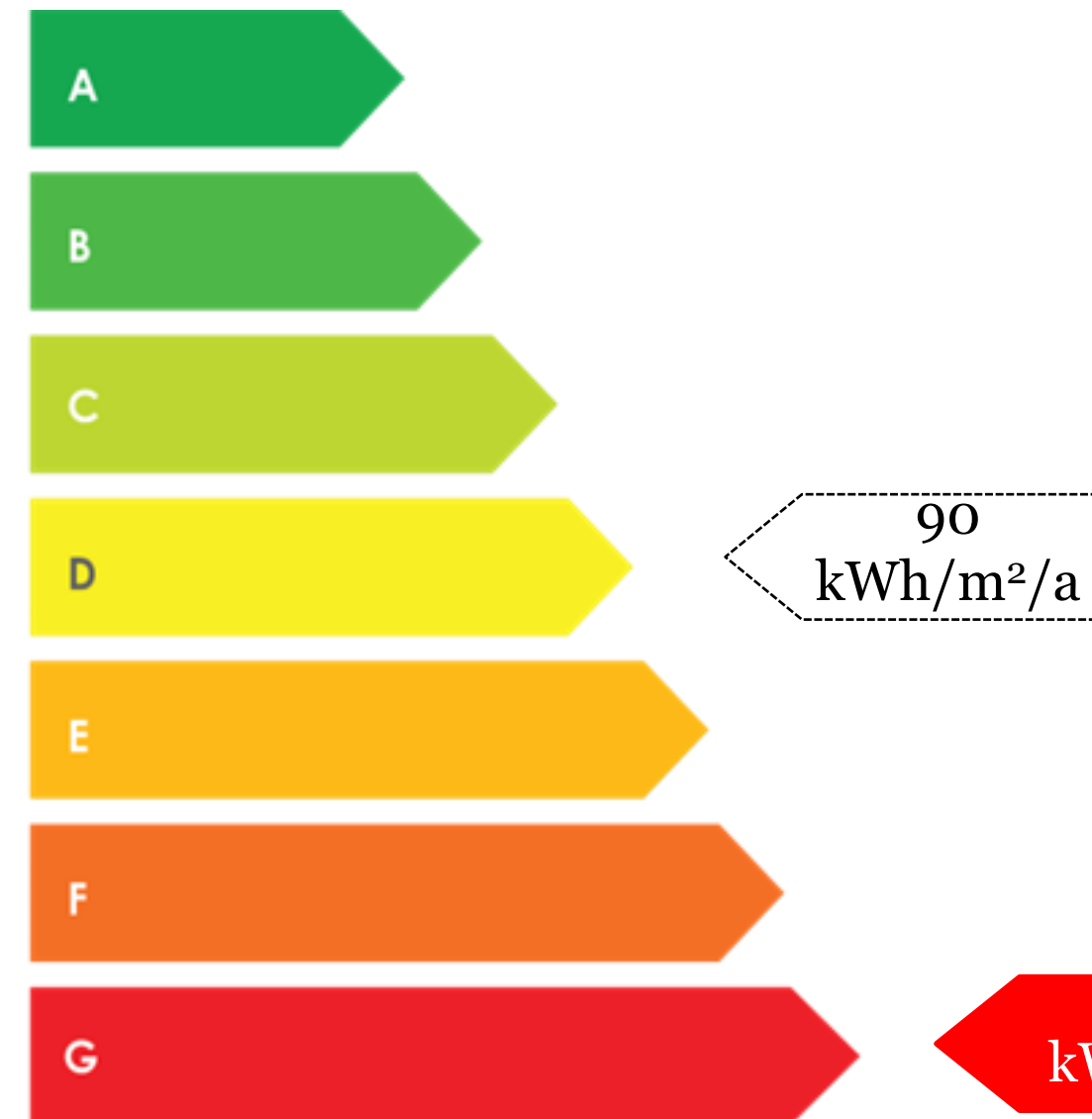
Reference value – Standard value against which energy rating is **compared**

$$\begin{aligned} \text{Multiple of Reference Value} &= \frac{\text{BEP}}{\text{Benchmark}} \\ &= \frac{275}{90} \\ &= \mathbf{3,056} \end{aligned}$$

Performance Grade	Performance Scale
Grade A	EP < 0,30 Er
Grade B	0,3 Er ≤ EP < 0.6 Er
Grade C	0.6 Er ≤ EP < 0.9 Er
Grade D	0.9 Er ≤ EP < 1.1 Er
Grade E	1.1 Er ≤ EP < 1.7 Er
Grade F	1.4 Er ≤ EP < 1.7 Er
Grade G	1.7 Er ≤ EP



Very energy efficient



Not energy efficient



DEMOSTRATION OF BUILDING REGISTRATION ON THE NBEPR



CONTACTS AT SANEDI : EPC SUB–PROGRAMME

EPC Enquiries: epcenquiries@sanedi.org.za

Website: <https://www.sanedi.org.za/energy-performance-certificates/index.htm>

NBEPR: <https://epc.sanedi.org.za/login>

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Stalin Ndlovu (Senior M & V Advisor) - StalinN@sanedi.org.za

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**Thank
You**



ENERGY PERFORMANCE CERTIFICATES (EPCs) TRAINING MANUAL



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NOMENCLATURE

Abbreviations	Meaning
DEE	Department of Electricity and Energy
EPA	Energy Performance Assessment
EPC	Energy Performance Certificate
NBEPR	National Building Energy Performance Register
SANEDI	South African National Energy Development Institute
SANS	South African National Standards

Terminology	Definition
Accounting Officer	A national or provincial department mentioned in the first column of Schedule 1, 2 or 3 to the Public Service Act, 1994 (Proclamation No. 103 of 1994), subject to the Public Finance Management Act, 1999 (Act No.1 of 1999), means the officer who is the incumbent of the post bearing the designation mentioned in the second column of the said Schedule 1, 2 or 3 opposite the name of the relevant national or provincial department;
	A municipality, subject to the Municipal Finance Management Act, 2003 (Act No.56 of 2003), means the municipal manager appointed in terms of section 82 of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998);
Building	Roofed construction with walls, for which energy is used to condition the indoor climate, and to provide domestic hot water and illumination and other services related to the use of the building
Delivered Energy	Energy, per energy carrier, supplied to the building system, to satisfy the uses taken into account (heating, cooling, ventilation, domestic hot water, lighting, appliances, etc.) or to produce electricity
Energy Performance	Net energy consumed in kilowatt hours per square metre per year (kWh/m ² /a) to meet the different needs associated with the use of the building excluding measured or assessed energy consumed by garages, car parks and storage areas as well as energy consumed by outdoor services (for example landscape lighting and security), which may include, inter alia, heating, hot water heating, cooling, ventilation, and lighting

Energy Performance Certificates	Certificate that indicates the energy performance of a building and that is issued in accordance with this standard by an accredited body
Major Renovation	Any changes to a building or structural changes that require planning approval from a relevant local authority in terms of the National Building Regulations and Building Standards Act
Measured Energy Performance	Operational energy performance based on measured amounts of energy consumed
Multiple Occupancy	A building in which no discrete occupancy accounts for ≥ 90 % of the net floor area of the building
Net Floor Area	Sum of all areas between the vertical building components (walls or partitions), excluding garages, car parks and storerooms
Net Energy	Delivered energy minus exported energy
Reference Value (Er)	Standard value against which an energy indicator/rating is compared
Single Occupancy	A building in which an occupancy accounts for ≥ 90 % of its net floor area
Unoccupied Floor Area	Unoccupied or vacant area that is not being used for its intended function and that is not consuming any net energy

1. INTRODUCTION

This training manual is intended for accounting officers, building owners, building managers/ facility managers who are in the process of obtaining energy performance certificates for their building(s). It further elaborates on their roles and responsibilities in complying to the EPC Regulation.

The then Minister of Mineral Resources and Energy has under section 19(1)(b) of the National Energy Act, 1998 promulgated the Regulations for the Mandatory Display and Submission of Energy Performance Certificates (EPC) for Buildings on 08 December 2020.

Energy Performance Certificates are mandatory for **private sector, non-residential buildings with a total net floor area of 2 000m² and more, and government owned, occupied, or operated buildings with a net floor area of 1 000 m² and more.** Energy Performance Certificates must be displayed at the building's main entrance by the 07th of December 2025; and a certified copy of the EPC submitted by the building owner/accounting officer to the South African National Energy Development Institute (SANEDI) within 3 months from the date the EPC is issued.

SANEDI is mandated by the Regulation for the Mandatory Display and Submission of Energy Performance Certificates for Buildings to maintain a National Building Energy Performance Register (NBEPR). This register must include the particulars of all buildings that fall within the regulated building classifications as well as all issued energy performance certificate together with relevant assessment data and register EPC professionals who will supersede SANAS Accredited Inspection Bodies as the experts responsible for the issuance EPCs as at 01st August 2024.

Failure to comply with this regulation **building owners or accounting officers will face a fine of up to 5 million rands or 5 years imprisonment or both such fines.**

Table 1: Mandatory occupancy classifications as stipulated in the EPC Regulations, 2020

Occupancy Classifications	Description
A1: Entertainment and Public Assembly	Occupancy where persons gather to eat, drink, dance or participate in other recreation
A2: Theatrical and Indoor Sport	Occupancy where persons gather for the viewing of theatrical, operatic, orchestral, choral, cinematographical or sport performances
A3: Places of Instruction	Occupancy other than primary or secondary schools, where students or other persons assemble for the purpose of tuition or learning.
	Occupancy where school children assemble for the purpose of tuition or learning.
G1: Offices	Large multi-storey office buildings, banks, consulting rooms and similar uses with lifts and energy consuming services that operate on a typical daytime occupancy.
	Stand-alone blocks and / or campus of buildings that form an office park but operate separately.

2. WHAT IS AN ENERGY PERFORMANCE CERTIFICATE (EPC)?

An Energy Performance Certificate (EPC) is a certificate for buildings, which indicates its energy performance and displays how efficiently the building is operating. This certificate is measured against an energy efficiency scale with A being most efficient, D being the best practice and G being least efficient.

2.1. PURPOSE OF ENERGY PERFORMANCE CERTIFICATION

The Government of South Africa through the Department of Mineral Resources and Energy (DMRE) released the first National Energy Efficiency Strategy (NEES) in 2005.¹ This strategy aimed to respond to the increasing demand for energy alongside a growing commitment to improving resource use and reducing South Africa's national environmental footprint.¹ The NEES set an overall reduction target in energy intensity of 12% by 2015, and sectoral energy intensity improvements as follows: industry and mining (15%), power generation (10%), transport (9%), commercial and public building sector (15%), and residential (15%).¹

It has also allocated goals per sector whereby its states that within the public and commercial sector the current rate of improvement in the energy consumption per square metre in buildings occupied by the public sector and lettable/inhabited floor space in the commercial sector should be accelerated.¹

- EPCs play a crucial role in achieving these goals as they are an indicative tool which allows for government to obtain a baseline of the energy consumption of buildings throughout South Africa.
- EPCs promote an energy efficiency culture across the sector which ultimately improve economic growth and environmental impact mitigation.
- EPCs promote GHG emissions reduction as reliable/credible data can be used to implement energy efficiency measures within buildings.

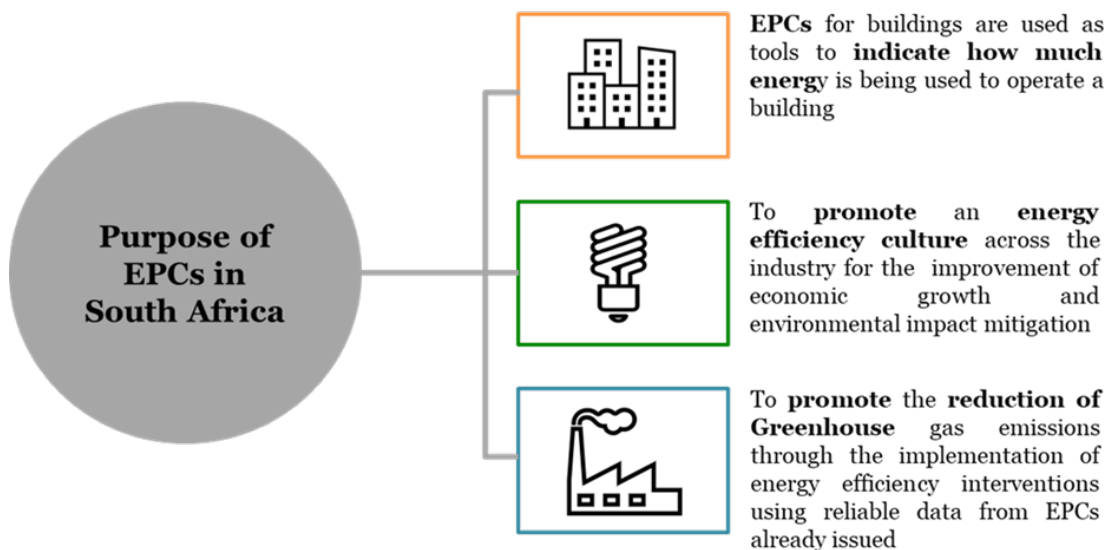


Figure 1: Purpose of EPCs in South Africa

3. POLICIES ENABLING ENERGY PERFORMANCE CERTIFICATES

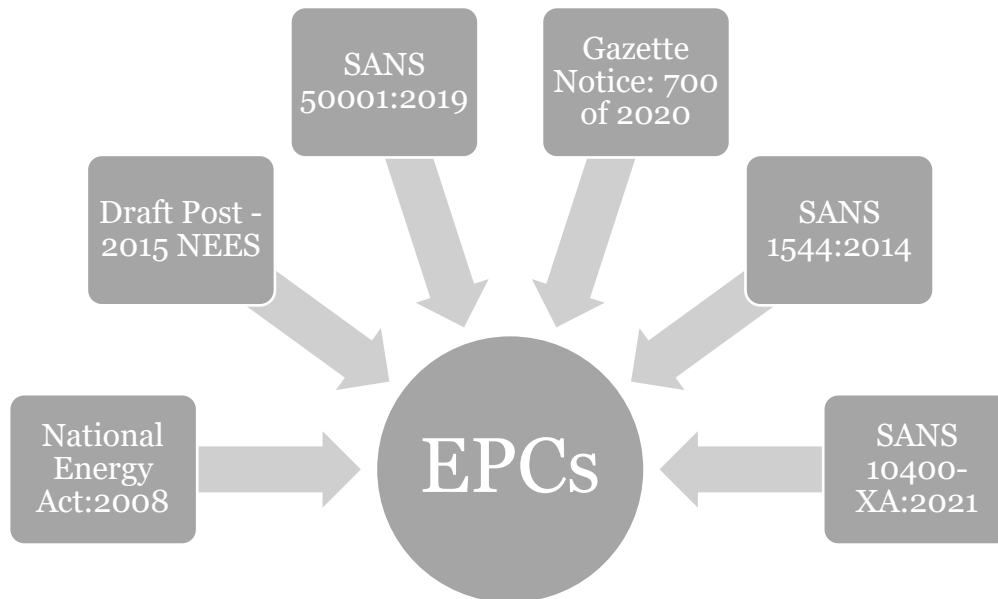


Figure 2: Policies Enabling Energy Performance Certificates

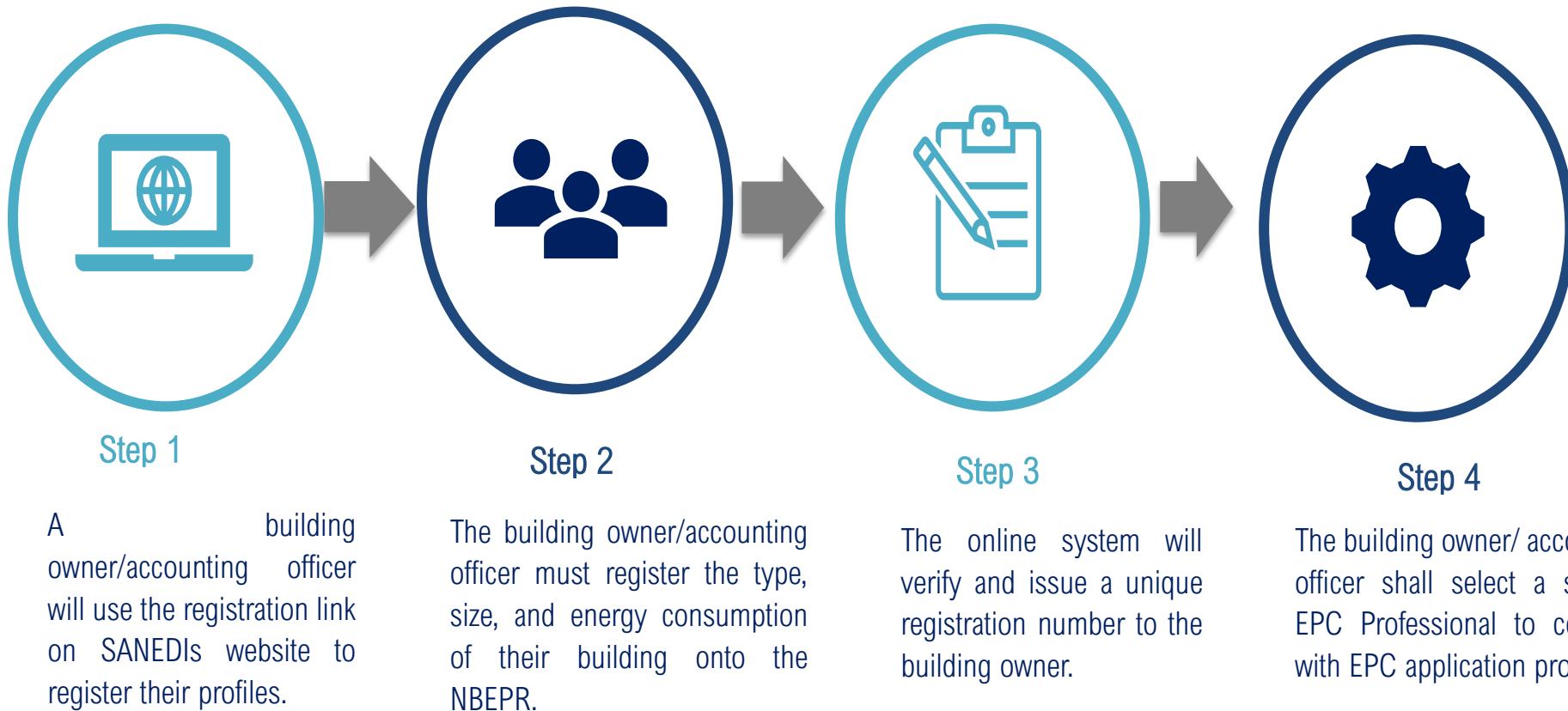
The National Energy Act	An Act used to ensure that diverse energy resources available at sustainable quantities and at affordable prices.
Draft Post-2015 NEES	An Energy Efficiency strategy used to accelerate the current rate of improvement in the energy consumption per square metre in buildings occupied by the public sector at the national, provincial, and municipal levels and commercial buildings.
SANS 50001:2019	A standard used to establish the systems and processes necessary to improve the energy performance, energy efficiency and the consumption of a building.
Gazette Notice 700 of 2020	The regulation for the Mandatory Display and Submission of Energy Performance Certificates for buildings.
SANS 1544:2014	A standard that specifies the requirements for producing Energy Performance Certificates.
SANS 10400-XA:2021	A standard that provides deemed-to-satisfy requirements for compliance of energy usage in building of the National Building Regulation.

4. KEY STAKEHOLDERS: ROLES AND RESPONSIBILITIES

Key Stakeholder	Responsibility
DEE	Is the custodian of all energy policies and energy security in South Africa and is also the Regulator of EPCs. They are also responsible for compliance monitoring.
SANEDI	Is mandated by the Regulation to develop and maintain the National Building Energy Performance Register, to issue unique EPC numbers.
SANEDI EPC Registered Professionals	Is the individuals that have been registered by South African National Energy Development Institute. They are responsible for performing an Energy Performance Assessment and issuing of Energy Performance Certificates.
Accounting officer	Is responsible for displaying the EPC at the entrance of their building and submit a certified EPC copy to SANEDI within 3 months from the date of issue.
Building Owner	Is responsible for displaying the EPC at the entrance of their building and submit a certified EPC copy to SANEDI within 3 months from the date of issue.

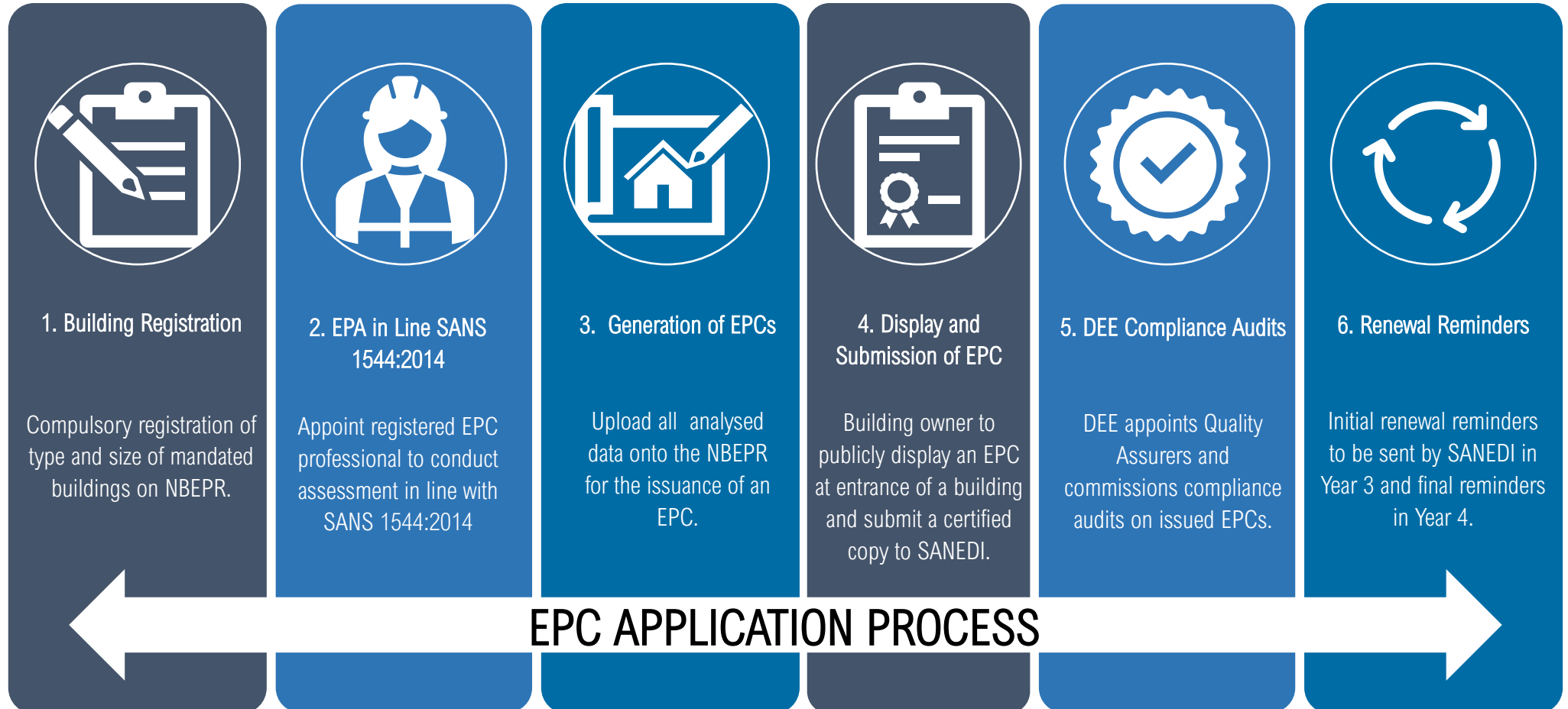
5. APPLICATION PROCESS FOR BUILDING REGISTRATION

Below is a 4-step process to use when registering a building on the NBEPR: Link: <https://epc.sanedi.org.za/login>



6. APPLICATION PROCESS FOR ENERGY PERFORMANCE CERTIFICATES

Below is an 6-step process to use to comply to the Regulation:



Link: <https://epc.sanedi.org.za/login>

7. ENERGY PERFORMANCE ASSESSMENT

Energy Performance assessments are conducted by an assessor using the data provided by Building Owner/ Accounting Officer or authorised third party. The data provided is imperative in this process as it is an input factor when measuring the EP of a building.

The below information should be considered **before** the assessment is conducted:

- Number of Tenants
- Occupancy Class (Single, Multiple)
- Building Classification Per Occupant
- Year of Construction
- Year of Last Major Renovation
- Energy Zone
- Number of Floors
- Net Floor Area
- Net Energy Consumption

Once you have considered the above, the following steps will be conducted:

1. Data Collection
2. Application of SANS 1544: 2014 and SANS 10400-XA: 2021
3. Understanding the EPC and its contents

7.1. DATA COLLECTION

Building Information

- Collect [Building Floor Plans](#)
- Collect [Occupancy Certificate](#)
- [Operational Hours](#) of the Building
- Calculate the Total [Exclusion Areas](#).
- Calculate the Total Unoccupied Areas.



Figure 3: Example of a Building Floor Plan

Building Energy Consumption Data (12 Months Consecutive Data)

- Collect **Electricity Bills** – Municipality Bills or Eskom Bills.
- Collect **Gas Bills** – Meter Readings
- Collect **Solid Fuel Consumption Data**- Delivery Record
- Collect **Liquid Fuel Consumption Data**- Meter Reading and Deliver Record
- Collect **Solar PV Consumption Data**- Meter Reading
- Collect **Imported Energy Consumption Data**-Meter Reading.
- Collect **Exported Energy Consumption Data**- Meter Reading.
- Calculate **Excluded Energy**- Including Counting Lights on Exclusion Areas.



Figure 4: Different energy sources a building uses for consumption

Sub-metering

Metering of multiple tenants is necessary when there are different tenants in a building are performing different activities that fall within different occupancy classifications according to SANS 10400-XA:2021.

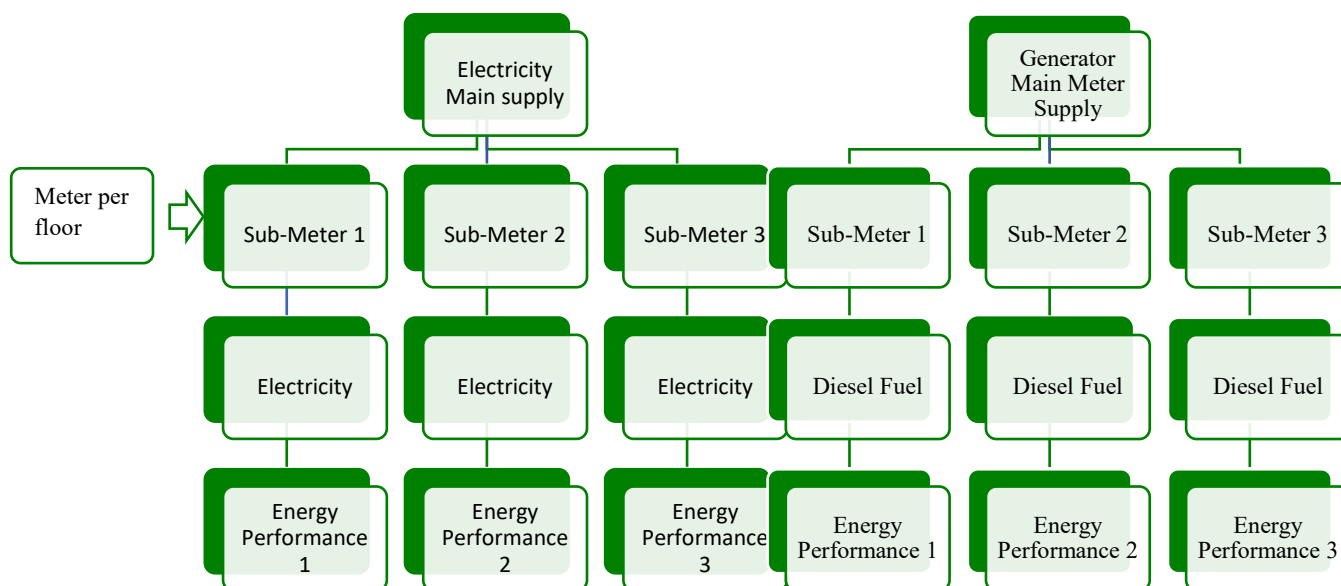
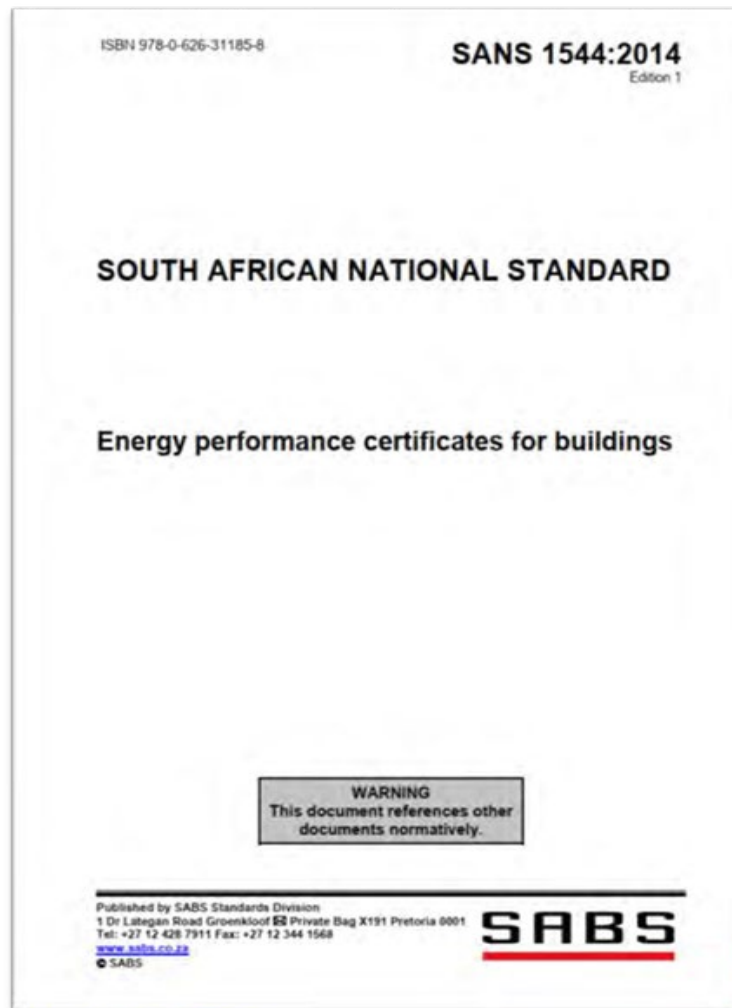


Figure 5: Diagram of possible sub-metering

7.2. APPLICATION OF SANS 1544:2014



SANS 1544:2014

- This standard specifies the requirement for **producing** Energy Performance Certificate
- It includes **definitions applicable** in producing an EPC
- It includes the specification for the format of the Energy Performance Certificate.
- It focuses on **existing building** that have been in operation for 2 years or longer and that have not been subject to a **major renovation** or **change of occupancy** within the year of assessment period.

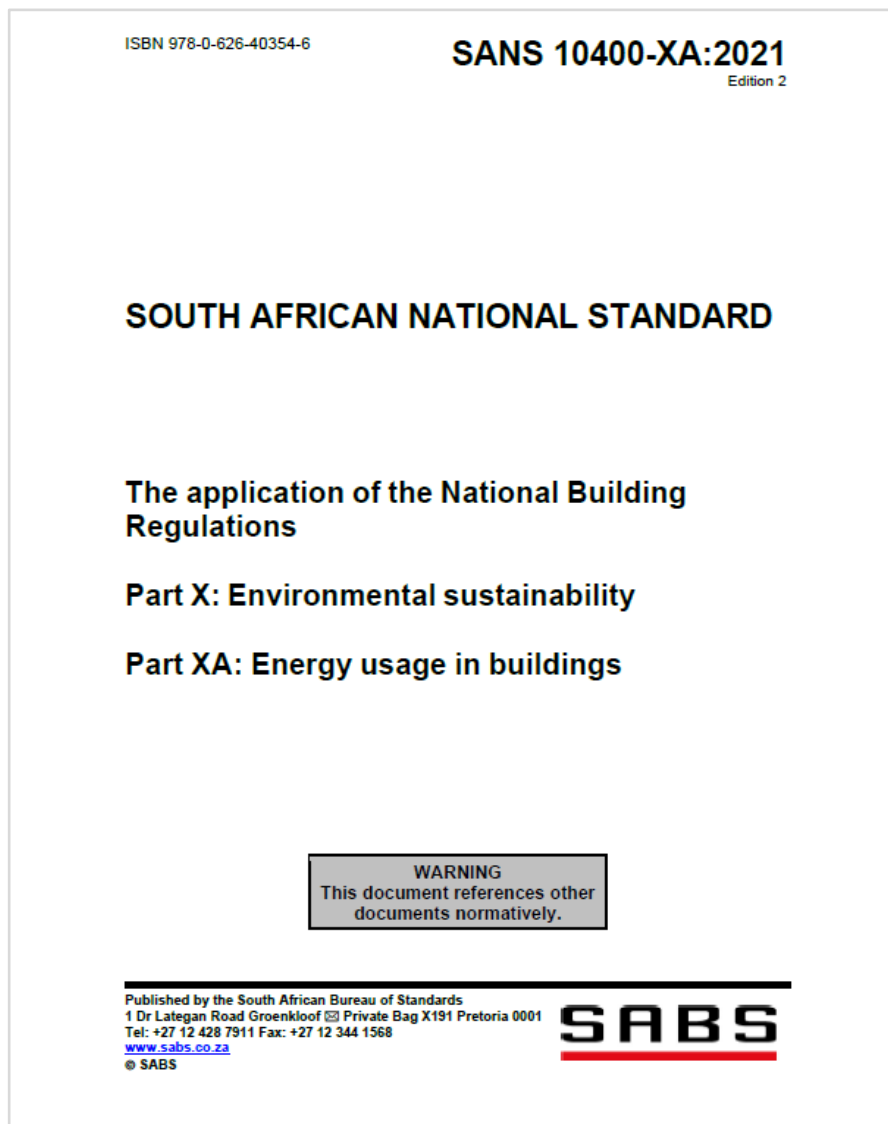
Name of building		A Government Building			
Occupancy class	Office (G1)	Climatic zone	1 (Cold interior)		
Occupancy rate (in net floor area)		C (100 %)			
A - Energy used in entire building complex					
Energy used for	Heating	Cooling	Lighting	Electrical appliances	Outside net floor area (specify under B)
Please tick	x	x	x	x	X
Energy source		From (date)	To (date)	kWh used	
Electricity		2011/01/01	2011/12/31	415,000	
Gas		n/a	n/a		
Other		n/a	n/a		
B - Energy used outside net floor area					
Energy used for	Watts	N°	Time of use	Calculation	kWh used
Lights parking	58	25	24/7	0,058(kW)-25-24(h)-365(d)	12,702
Outside lights	100	120	8 h/d	0,1(kW)-120-8(h)-365(d)	35,040
Ventilation storage	45	1	24/7	0,045(kW)-25-24(h)-365(d)	9,855
Fridges storage	500	2	24/7	0,5(kW)-2-24(h)-365(d)	8,780
Total					91,761*
* Represents more of 10 % of total consumption [415,000 kWh] therefore displayed in EPC as excluded energy in kWh/(m ² -a) [91,761/1,250]					73
C - Net floor area					1,250 m²
Energy used in entire building complex in kWh		415,000	Consumption outside net floor area in kWh		91,761
Energy consumption net floor area in kWh					323,239
Energy consumption net floor area in kWh/(m²-a)					259
Maximum energy consumption (SANS 10400-XA)	Occupancy class	G1-Office	Climatic zone	1	200
Variance kWh/(m ² -a) [259-200]					59
Multiple of reference value [259/200]					1,29
Performance scale (see 5.1.3)					E

Source: SANS 1544:2014

SANS 1544:2014 – SUMMARY REPORT

- Used as a summary report of the assessment
- Demonstrates the calculations used to determine the usage of energy in excluded areas
- Indicates the net floor area
- Focuses on the **existing building** that have been in operation for 2 years or longer and that have not been subject to a **major renovation** or **change of occupancy** within the year of assessment Period.

7.3. APPLICATION OF SANS 10400-XA:2021



SANS 10400-XA:2021

- The standard specifies the minimum requirements for **efficiency** and **environmental sustainability** in building design.
- Includes the building occupancy classes and energy zones.
- Provide **maximum energy** consumption values.

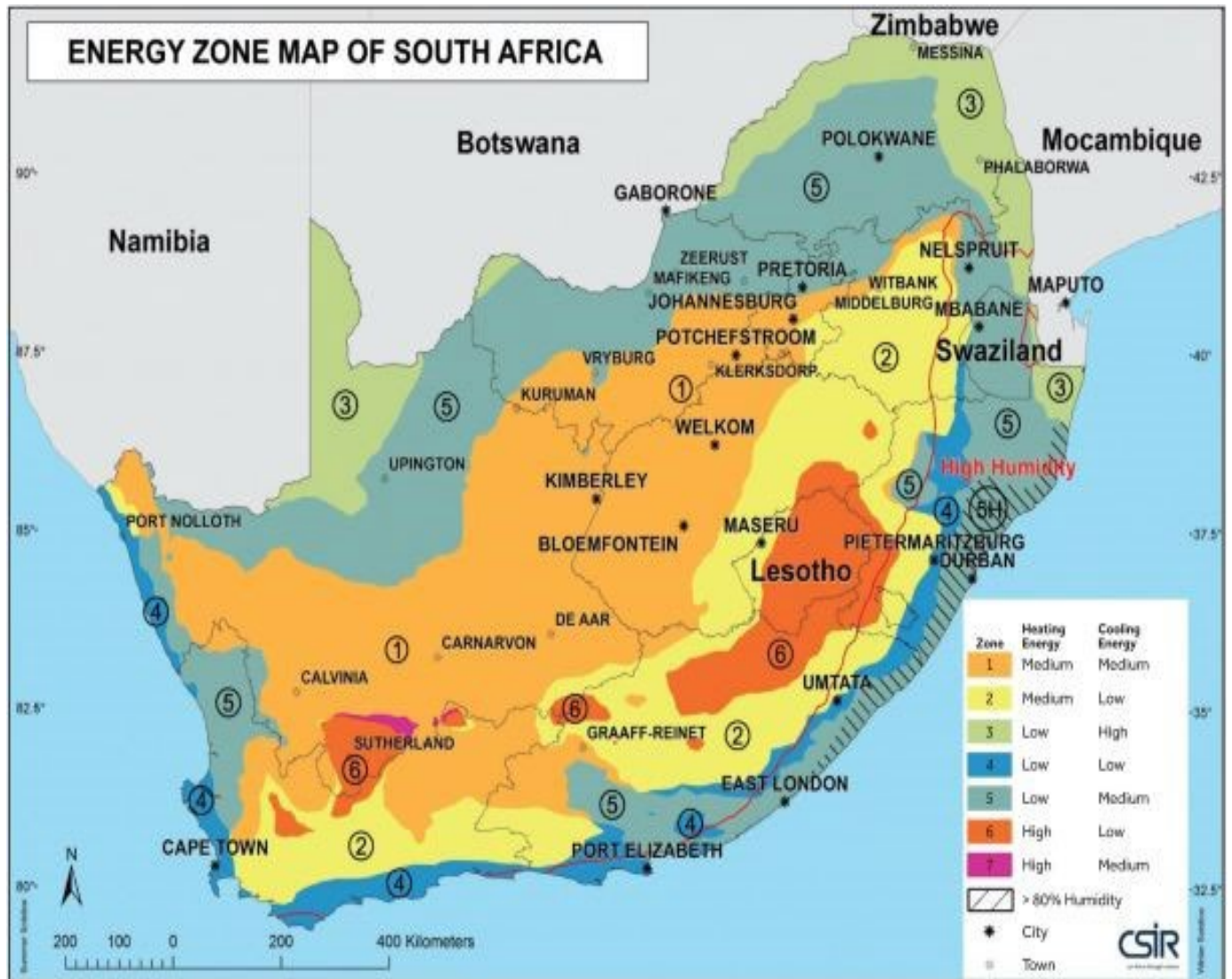
Definitions on Occupancy Classifications and Determination of Benchmarks against Energy Zones

Table 1 — Maximum annual energy consumption per building classification for each energy zone (kWh/m²/a) (Energy zones as shown in figure 1 and annex C)

Class of occupancy	2							
	Energy zones							
	1	2	3	4	5	5H	6	7
A1 Entertainment and public assembly Occupancy where persons gather to eat, drink, dance or participate in other recreation.	75	75	95	70	95	95	80	80
A2 Theatrical and indoor sport Occupancy where persons gather for the viewing of theatrical, operatic, orchestral, choral, cinematographical or sport performances.	95	95	110	90	110	110	105	105
A3 Places of instruction Occupancy other than primary or secondary schools, where students or other persons assemble for the purpose of tuition or learning.	110	155	110	125	140	140	120	120
A3 Places of instruction Occupancy where school children assemble for the purpose of tuition or learning	60	65	55	60	55	60	65	65
A4 Worship Occupancy where persons assemble for the purpose of worshipping.	70	45	45	40	50	40	70	70
G1 Offices Large multi-storey office buildings, banks, consulting rooms and similar uses with lifts and energy consuming services that operate on a typical daytime occupancy.	90	105	110	95	110	95	100	100
G1 Offices Stand-alone blocks and / or campus of buildings that form an office park but operate separately	70	150	190	145	180	165	75	75

Source: SANS 10400-XA:2021

Determination of Energy Zone of Building



Source: SANS 10400-XA:2021

7.4. THE ENERGY PERFORMANCE CERTIFICATE AND ITS CONTENT

12 Energy Performance Certificate for Buildings

1 Certificate Number: EPC-SA 00012-2024

2 12 Haarlem Pl
Boulevard
Randburg
Gauteng
2198

3 Very energy efficient

4 SANS 10400-XA 2021 maximum energy consumption in occupancy class in Energy Zone 1

5 Energy performance of your building

6 Building Information:

7 Administrative Information:

8

Carrier	Type	From (date)	To (date)	Energy [kWh]	Net Floor Area	Performance [kWh/m ²]	Exclusion Performance [kWh/m ²]
Grid	Electricity	2023/1/1	2023/12/31	100,000	8,000	11.67	1.25
Liquid Fuel	coal	2023/1/1	2023/12/31	50,000	8,000	5.83	

9 sanedi

10 Registered EPC Professional: Lesley

11 sanedi

1. Unique Energy Performance Certificate Number
2. Physical Address of the Building
3. Energy Performance Scale (Energy Efficiency Label)
4. Benchmark (SANS 10400-XA 2021)
5. Building's Measured Energy Performance
6. Building's Information
7. Administrative Information
8. Types of Energy Carriers and Building Performance
9. Registered EPC Professional Logo
10. Registered EPC Professional
11. SANEDI Logo
12. Energy Efficiency Logo



8. EXERCISES

8.1. FACTORS INFLUENCING A BUILDINGS ENERGY PERFORMANCE

The Energy Performance Assessment is conducted using energy consumption data from different energy sources the building consumes.

Energy performance of a building is affected by the following:

- 1) Location of the building
- 2) Rate of the energy consumption (kWh)
- 3) Size of the building (m²)
- 4) The occupancy rate of the building (%)

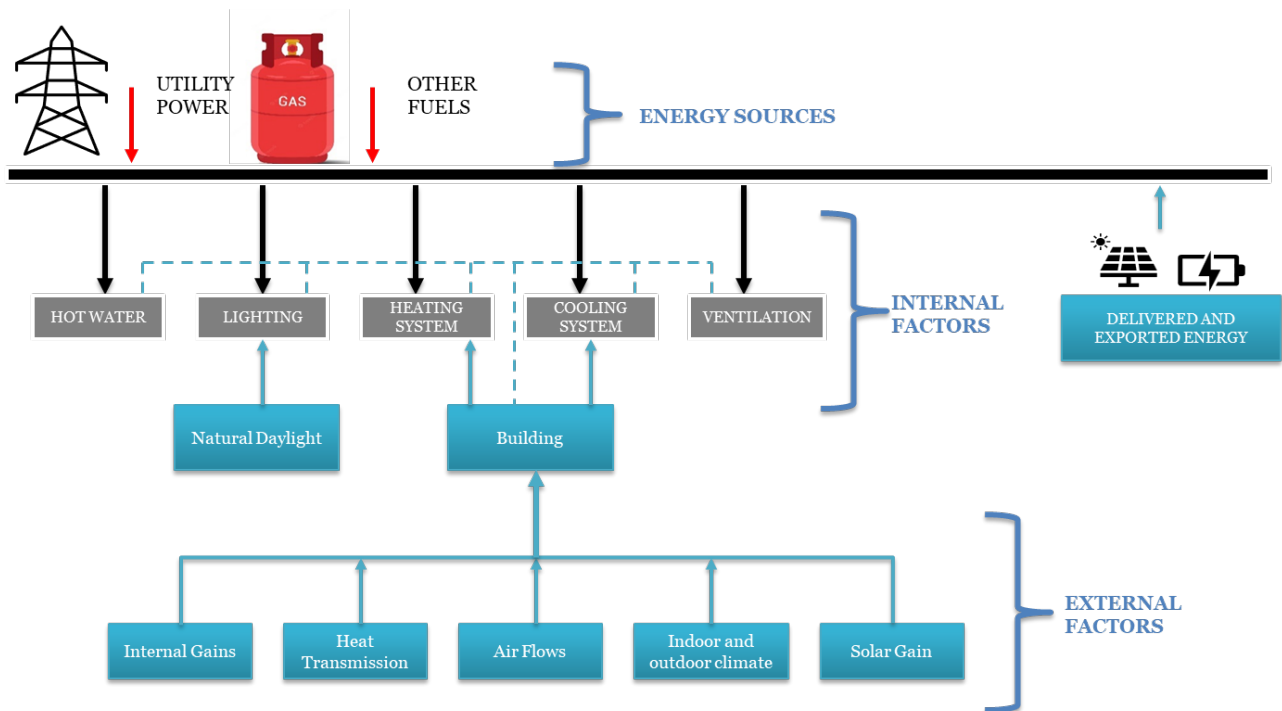


Figure 6: Diagram of factors affecting the energy performance of a building

Example

An office block building located in Cape Town occupied 100% of a building a year with the energy consumption of 120 000 kWh and a net floor area of $5000m^2$, and an office block building located in Johannesburg occupied only 50% of the building a year with the same energy consumption and the same net floor area.

Cape Town

Energy Zone: 4

Benchmark: 145



Johannesburg

Energy Zone: 1

Benchmark: 70



Energy Performance = $kWh/m^2/a$

Energy Performance = $120\ 000/5000 \times 100\%$

Energy Performance = $24\ kWh/m^2$

Performance scale = $24/145$

Performance scale = 0,16

Rating = A

Energy Performance = $kWh/m^2/a$

Energy Performance = $120\ 000/5000 \times 50\%$

Energy Performance = $12\ kWh/m^2$

Performance scale = $12/70$

Performance scale = 0,17

Rating = A

8.2. DETERMINING THE ENERGY PERFORMANCE OF A SINGLE OCCUPANCY BUILDING

Example

A government office block building located in Johannesburg, Gauteng



Figure 7: Floor Plan for Single Occupancy

Net Floor Area	Building Energy Performance
<p>Total floor area = sum of all building floor</p> <p>Total floor area = 300+80+80+100+100+1000+65+50</p> <p style="text-align: center;">= 1775m²</p> <p>Net floor area = total floor area – excluded area</p> <p>Net floor area = (300+80+80+100+100+1000+65)-50</p> <p style="text-align: center;">= 1725m²</p>	<p>BEP = $\frac{120000}{1725}$</p> <p style="text-align: center;">= 69,57kWh/m²/a</p> <p>Energy Grading = $\frac{69,57}{70}$</p> <p style="text-align: center;">= 0,99</p> <p>Performance scale = D</p>

8.3. DETERMINING THE ENERGY PERFORMANCE OF A MULTIPLE OCCUPANCY BUILDING

Example

A building located in Cape Town which operates as a school and has offices



Figure 8: Floor Plan for a Multiple Occupancy

8.4. CALCULATIONS

Net Floor Area	
<p><u>School</u></p> <p>Net floor area = Total floor area – Total floor exclusion</p> <p>Total floor area = 4200m²</p> <p>Total floor exclusion = 800m²</p> <p>Net floor area = 4200m² – 800m²</p> <p style="padding-left: 40px;">= 3400m²</p> <p>Occupied area ratio = 57,6%</p>	<p><u>Offices</u></p> <p>Net floor area = Total floor area – Total floor exclusion</p> <p>Total floor = 3000m²</p> <p>Total floor exclusion = 500m²</p> <p>Net floor area = 3000m² – 500m²</p> <p style="padding-left: 40px;">= 2500m²</p> <p>Occupied area ratio = 42,4%</p>
<p>Total net floor area = 3400 + 2500</p> <p style="padding-left: 40px;">= 5900</p> <p>Occupied area ratio = $\frac{3400}{5900} \times 100\%$</p> <p style="padding-left: 40px;">= 57,6%</p>	<p>Total net floor area = 3400 + 2500</p> <p style="padding-left: 40px;">= 5900</p> <p>Occupied area ratio = $\frac{2500}{5900} \times 100\%$</p> <p style="padding-left: 40px;">= 42,4%</p>

Building Energy Performance	
<p>Net energy consumption = 41500 kWh/a</p> <p>BEP = $\frac{41500}{3400}$</p> <p style="padding-left: 40px;">= 12,21kWh/m²</p> <p>Prorated = 12,21 x 57,6%</p> <p style="padding-left: 40px;">= 7,03kWh/m²</p> <p>Prorated benchmark = 125 x 57,6%</p> <p style="padding-left: 40px;">= 72 kWh/m²</p>	<p>Net energy consumption = 82000kWh/a</p> <p>BEP = $\frac{82000}{2500}$</p> <p style="padding-left: 40px;">= 32,8kWh/m²</p> <p>Prorated = 32,8 x 42,4%</p> <p style="padding-left: 40px;">= 13,91kWh/m²</p> <p>Prorated benchmark = 95 X 42,4%</p> <p style="padding-left: 40px;">= 40,28 kWh/m²</p>
<p>Prorated BEP = 7,03 + 13,91</p> <p style="padding-left: 40px;">= 20,94kWh/m²</p> <p>Prorated benchmark = 72 + 40,28</p> <p style="padding-left: 40px;">= 112,28 kWh/m²</p> <p>Energy grading = $\frac{20,94}{112,28}$</p> <p style="padding-left: 40px;">= 0,18</p> <p>Performance Grade = A</p>	

9. REFERENCES

1. Draft National Energy Efficiency Strategy, 2015
2. Regulations on the Mandatory Display and Submission of Energy Performance Certificates, 2020
3. Draft Amendments to the Regulations on the Mandatory Display and Submission of Energy Performance Certificates, Nov 2022, 2023
4. Institute of Energy Professionals Africa NPC (IEPA)