

The NATIONAL BUILDING REGULATIONS

: Act 103 of 1977

Part 1 of 2

To provide for the promotion of uniformity in the law relating to the erection of buildings in the area of jurisdiction of Local Authorities by prescribing building standards

Rudolf Opperman

B. Arch (UPE) B. Build. (UPE) Pr. Arch SA 4283 MIA 5324

**Technical advisor; Architecture and National Building Regulations
National Regulator for Compulsory Specifications**

History - timelines and events affecting The National Building Regulations

Legislative Land Events in South Africa

- 1913 - Promulgation of the Native Land Act 36 of 1913.**
- 1936 - Promulgation of Native Development and Trust Land Act 1936.
- 1948 - Policy of apartheid (separateness) adopted when National Party (NP) takes power.**
- 1950 - Population classified by race. Group Areas Act no 41 of 1950.
- 1952 - The Pass Laws Act requires blacks to carry identification booklets at all times.**
- 1953 - The Separate Amenities Act establishes separate public facilities for whites and non-whites; the Bantu Education Act does the same to schools.
- 1955 - The ANC's Freedom Charter of 1955 set the goal of sharing land.**
- 1960s - International pressure against N.P. government begins, South Africa excluded from Olympic Games.
- 1970s - Numerous families forcibly resettled in black 'homelands'.**
- 1976 - Numerous students killed in clashes between protesters and security forces which starts in Soweto.
- 1977 - Steve Biko is arrested and dies of head injuries in police custody.**
- 1985 - As civil unrest increases and labour strikes threaten the economy.
- 1992 - FW de Klerk repeals all apartheid legislation.**
- 1994 - South Africa holds its first democratic election.
- 1996 - The South African Constitution is born.**

History - timelines and events affecting The National Building Regulations



Historic summary – South Africa

1970s - Numerous families forcibly resettled in black 'homelands'.

1976 - Numerous students killed in clashes between protesters and security forces which starts in Soweto.

1977 - S. is arrested and dies of head injuries in police custody

1985 - Increase in labor strikes and the economy

1652 to 1795
Dutch

1795 to 1803

British Annexation

1803 to 1806
Dutch

1806 to 1848

British - Union

1948 to 1992



South African
Republic

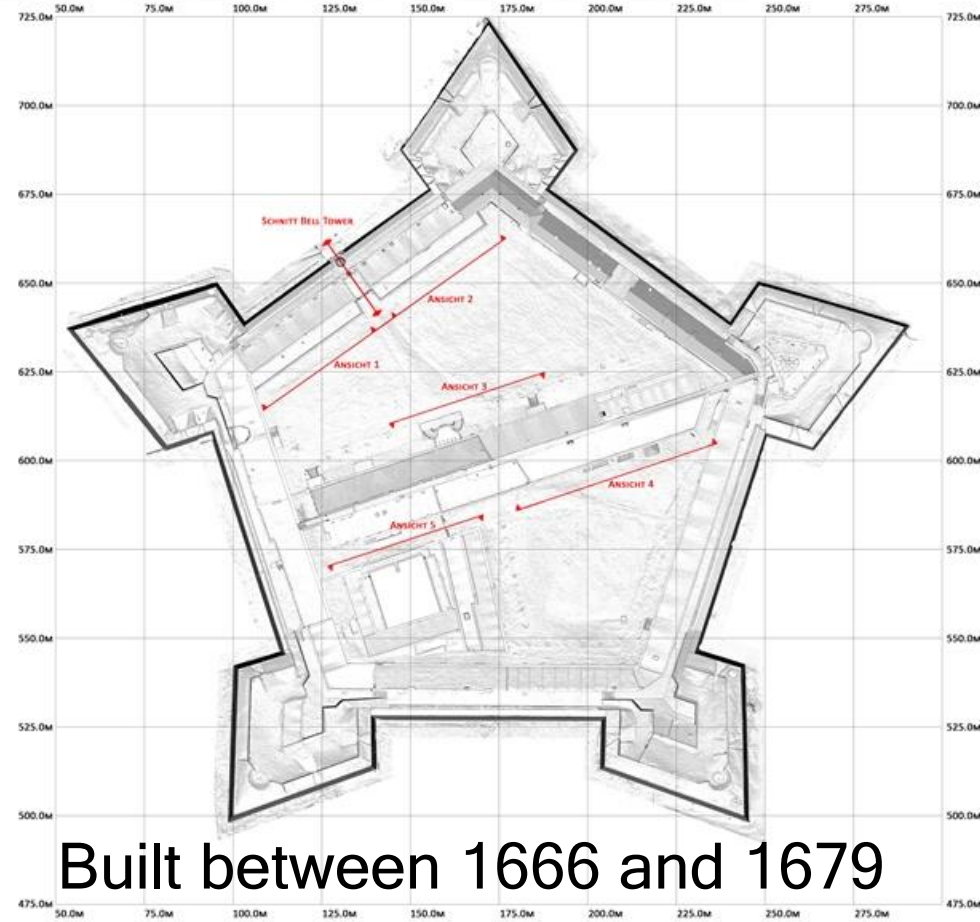
1992 to date
South Africa a
Constitutional state

199 - ... democratic

1996 - ... African ... is bo

History - timelines and events affecting The National Building Regulations

CASTLE OF GOOD HOPE, CAPE TOWN



Built between 1666 and 1679

The Arrival of the Dutch in the Cape - 6 April 1652

1996 South African Constitution is born.

1978

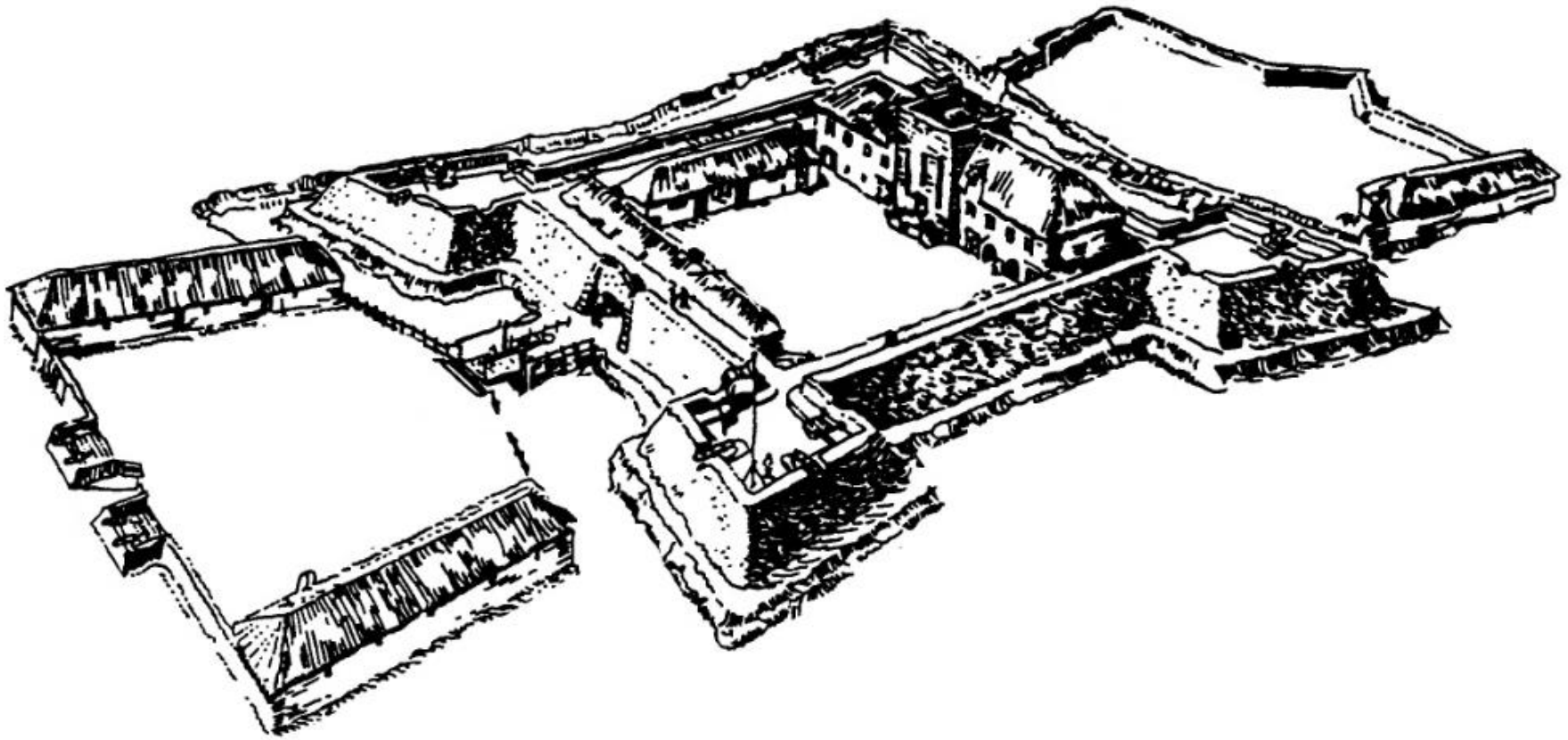
1652 to 1654
Dutch

1996

ca

Soweto.

History - timelines and events affecting The National Building Regulations



1970s - N

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1977 - S

1985

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Dutch

199

1996 -

The Witwatersrand Gold Rush occurred after the discovery in March 1886. This led to the establishment of Johannesburg.

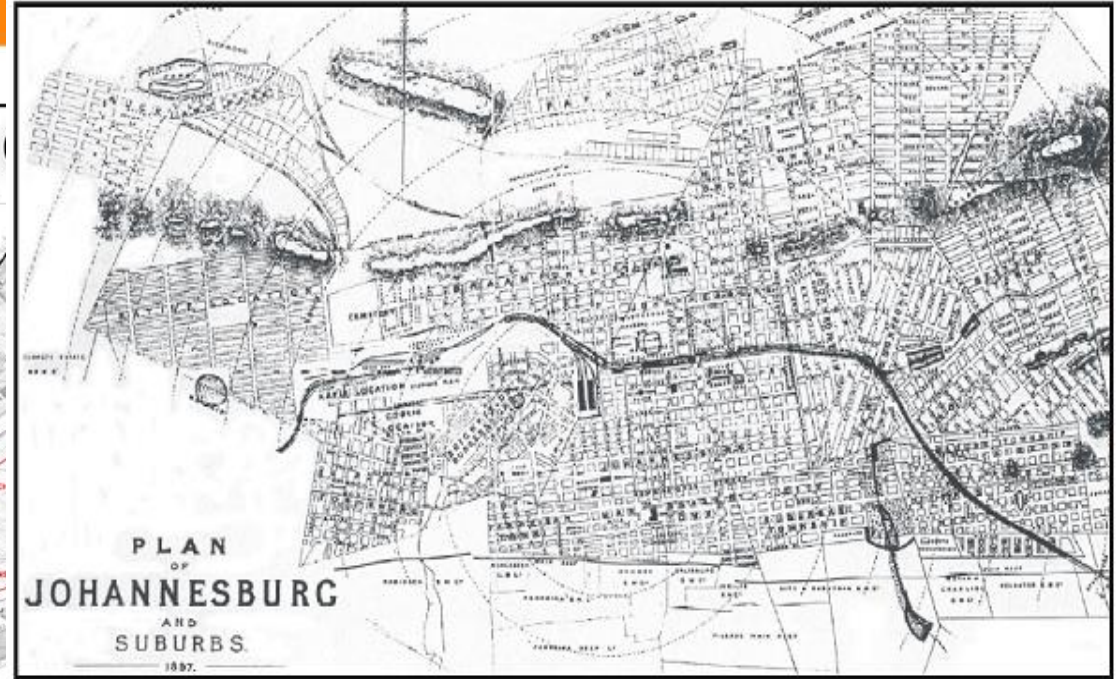
The town moved from **tent town to wood and iron shacks to bricks and mortar within 10 years**. The town became the largest in South Africa, outstripping the growth of Cape Town, which was more than 200 years older.

weto.

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al state

History - timelines and events affecting The National Building Regulations

Gold discovered at Witwatersrand 1886



1955 - The ANC

1960s - Intern

1970s - Nume

1976 - Numer

1977 - S

1985

191652 to 179

199 Dutch

1996 -

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Olympic Games.

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Africa a
Constitutional state

British Annexation

British Union

South African
Public

History - timelines and events affecting The National Building Regulations



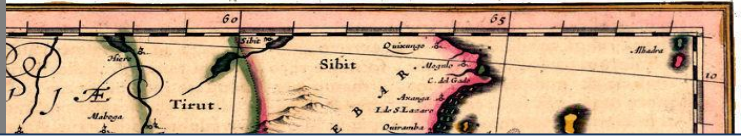
Anglo Boer War of 1899-1902



History - timelines and events affecting The National Building Regulations



The Witwatersrand Gold



The Natives Land Act of 1913



History - timelines and events affecting The National Building Regulations

1948



1957

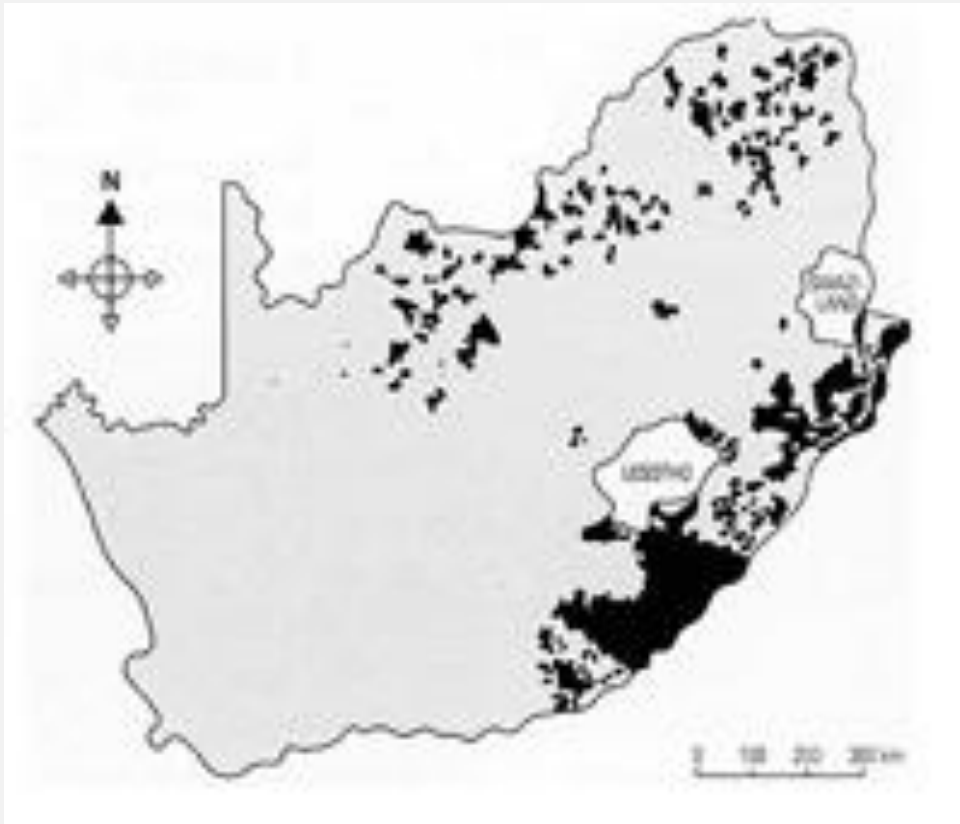


The Natives Land Act of 1913

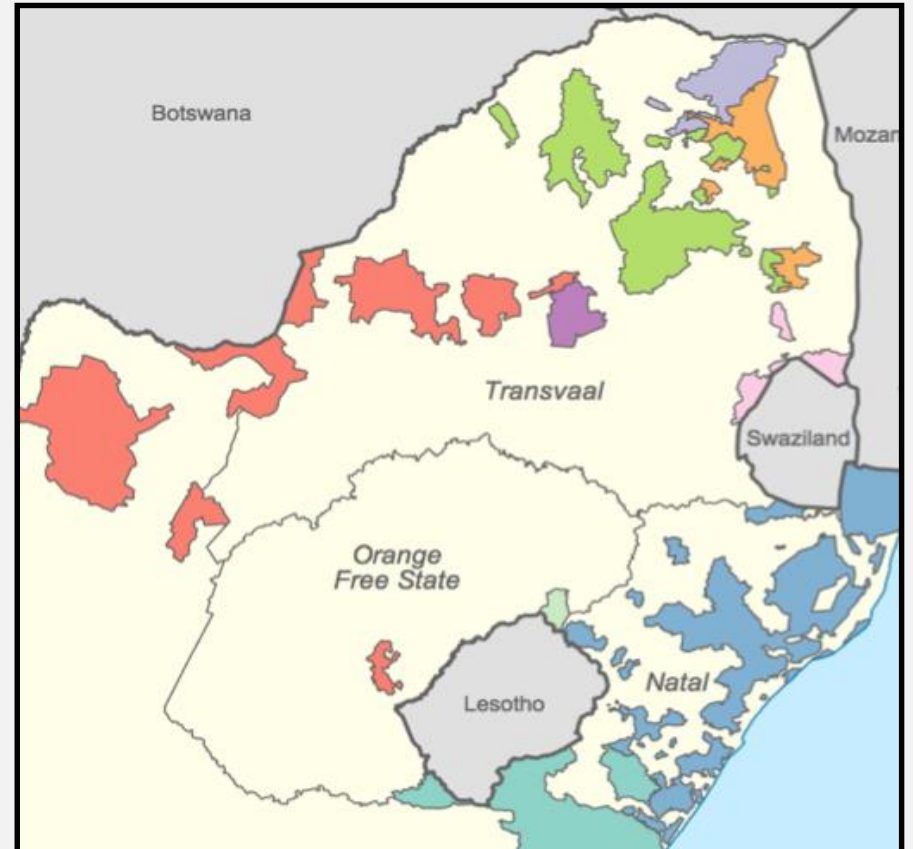


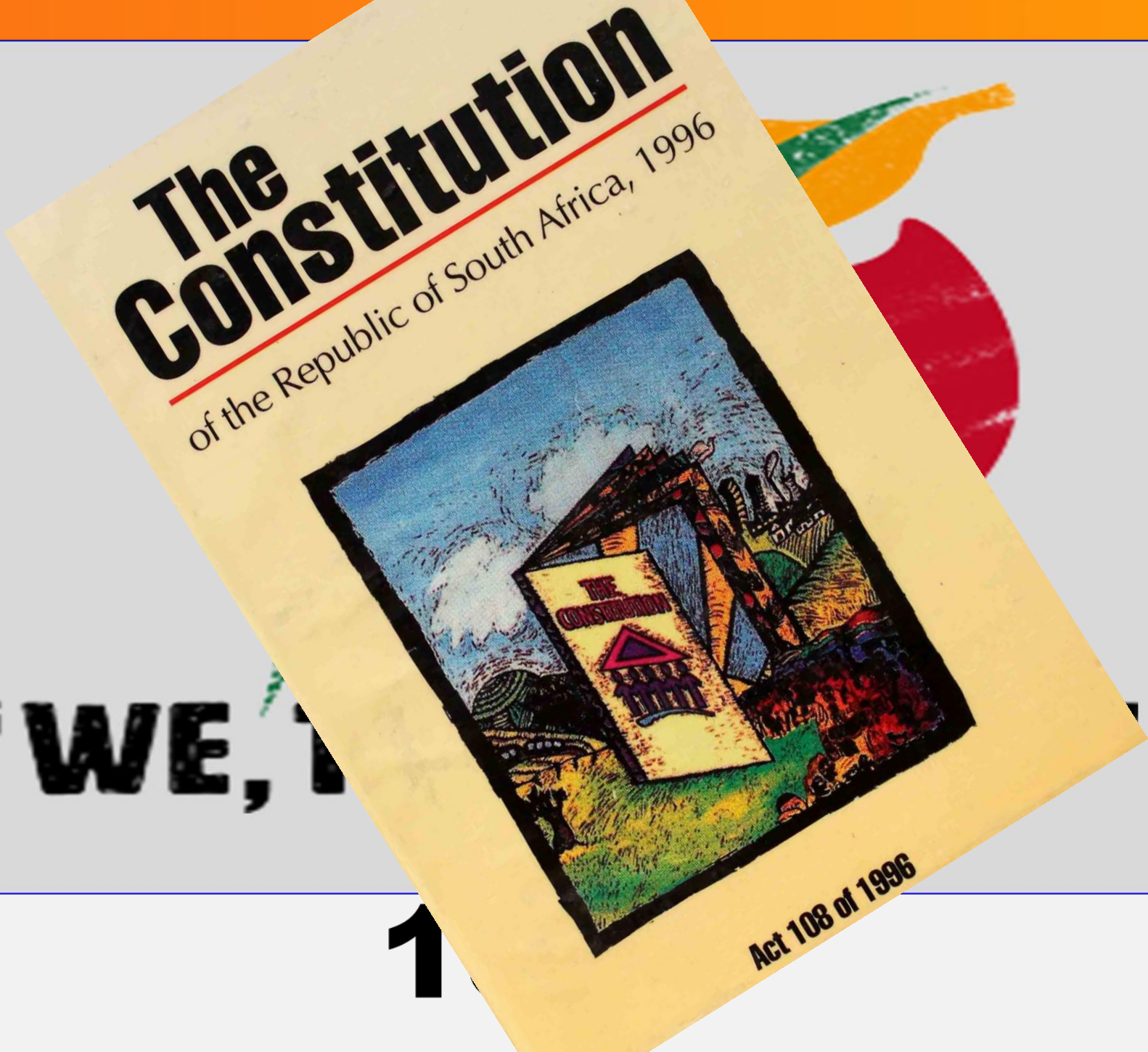
History - timelines and events affecting The National Building Regulations

The Natives Land Act of 1913



The Group Areas Act of 1950





“WE, THE

1

South Africa a Constitutional Democracy

The structure of the government



The South African
LEGISLATIVE DISPENSATION

Constitution
Act 108 of 1996

Acts made by Parliament

REGULATIONS made for the
execution to the Act

Technical requirements to the
regulations

Ordinances made by
provinces

By-laws made by Local
Authorities



The National Building Regulations and the TOWN PLANNING AND TOWNSHIPS ORDINANCE as well as Local Authority Processes

Constitution

156. Powers and functions of municipalities

A municipality has executive authority in respect of, and has the right to administer -

- (a) the local government matters listed in Part B of Schedule 4 and Part B of Schedule 5; and
- (b) any other matter assigned to it by national or provincial legislation.

A municipality may make and administer by-laws for the effective administration of the matters which it has the right to administer.

- (3) Subject to section 151(4), a by-law that conflicts with national or provincial legislation is invalid.

If there is a conflict between a bylaw and national or provincial legislation that is inoperative because of a conflict referred to in section 149, the by-law must be regarded as valid for as long as that legislation is inoperative.

Constitution

146. Conflicts between national, provincial legislation and Local Government By-laws

National legislation that applies uniformly with regard to the country as a whole **prevails over provincial legislation and Local Government By-laws** if any of the following conditions is met:

- (a) The national legislation deals with a matter that cannot be regulated effectively by legislation enacted by the respective provinces individually.
- (b) The national legislation deals with a matter that, to be dealt with effectively, **requires uniformity across the nation**, and the national legislation provides that uniformity by establishing -
 - (i) norms and standards;
 - (ii) frameworks; or
 - (iii) national policies.

TOWN PLANNING AND TOWNSHIPS ORDINANCE

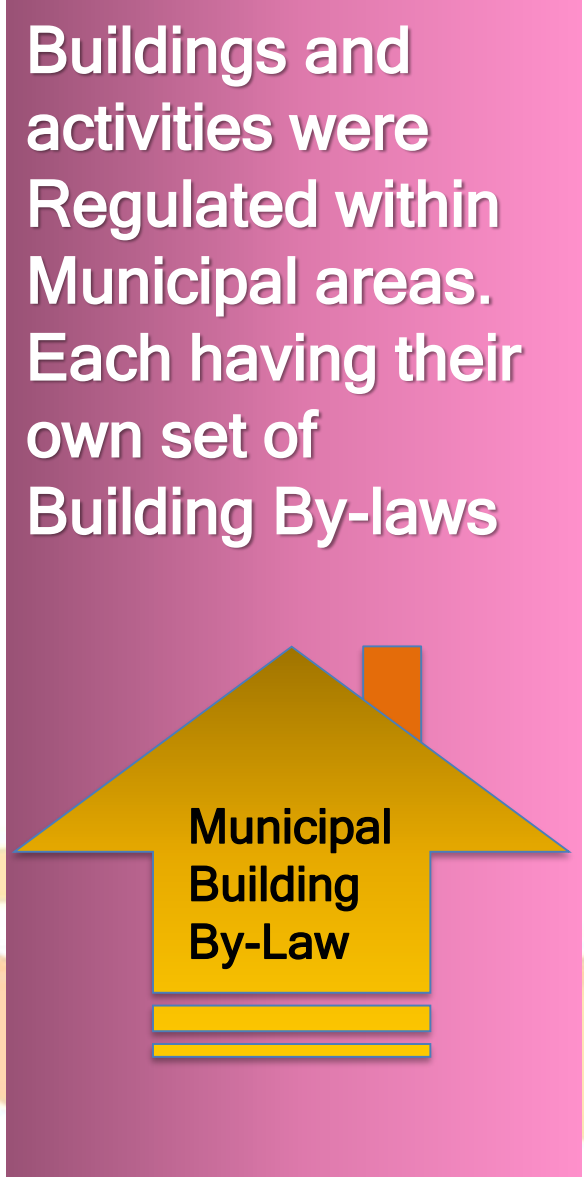
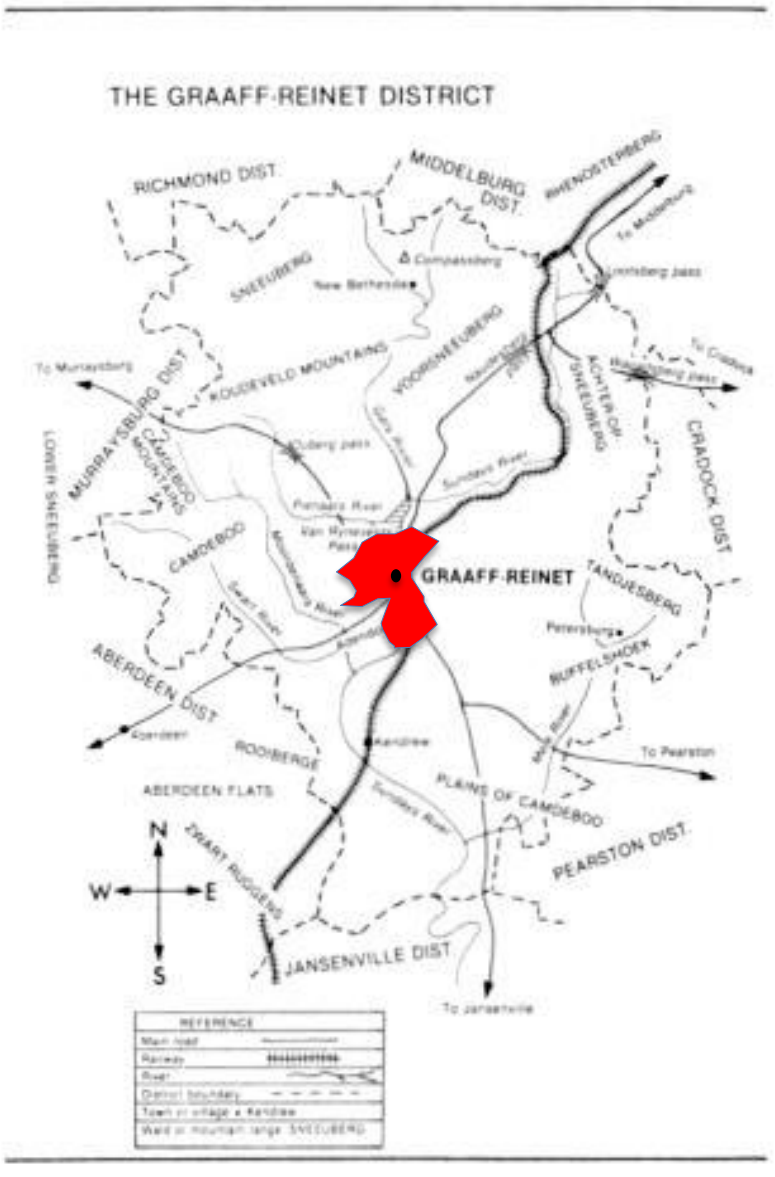
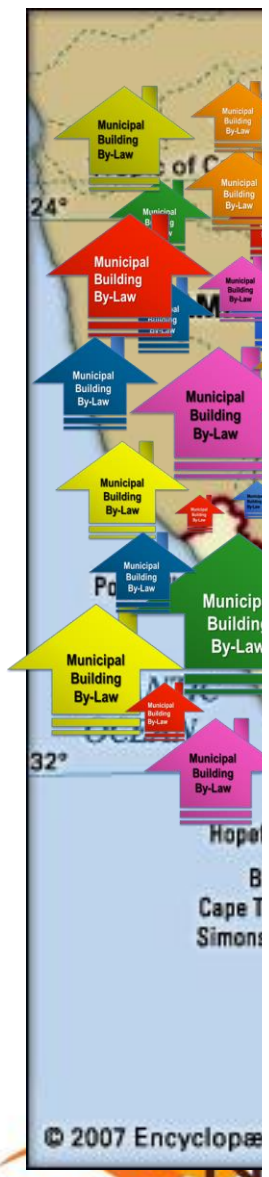
155 (6)(a) A metropolitan municipality shall have executive authority over those powers, functions and duties with all matters relating to Building Regulations & Municipal Planning.

The Building Regulations apply uniform standards on a Macro level.

Town planning schemes are area specific and enforce town planning requirements on the Micro level.

The National Building Regulations is the end legislation and hence makes the final determination in terms of all Building approvals. Because of this; the inclusion into the NBR of the responsibility to satisfy “any other applicable” legislation.

Timelines and important changes affecting The National Building Regulations



Buildings and activities were Regulated within Municipal areas. Each having their own set of Building By-laws

Timelines and important changes affecting The National Building Regulations

Peri-Urban



Graaff-Reinet

Municipality prior 2006

The municipal area comprised of, the area known Town extent comprising of the developed and area where the buildings ended before exiting the physical town. The town's buildings were subject to the Towns Building By-Laws.

The areas outside of town was classified as being Peri-Urban and was not under the control of the building By-laws

Timelines and important changes affecting The National Building Regulations

Local Government: Municipal Structures Act, (Act 117 Of 1998)

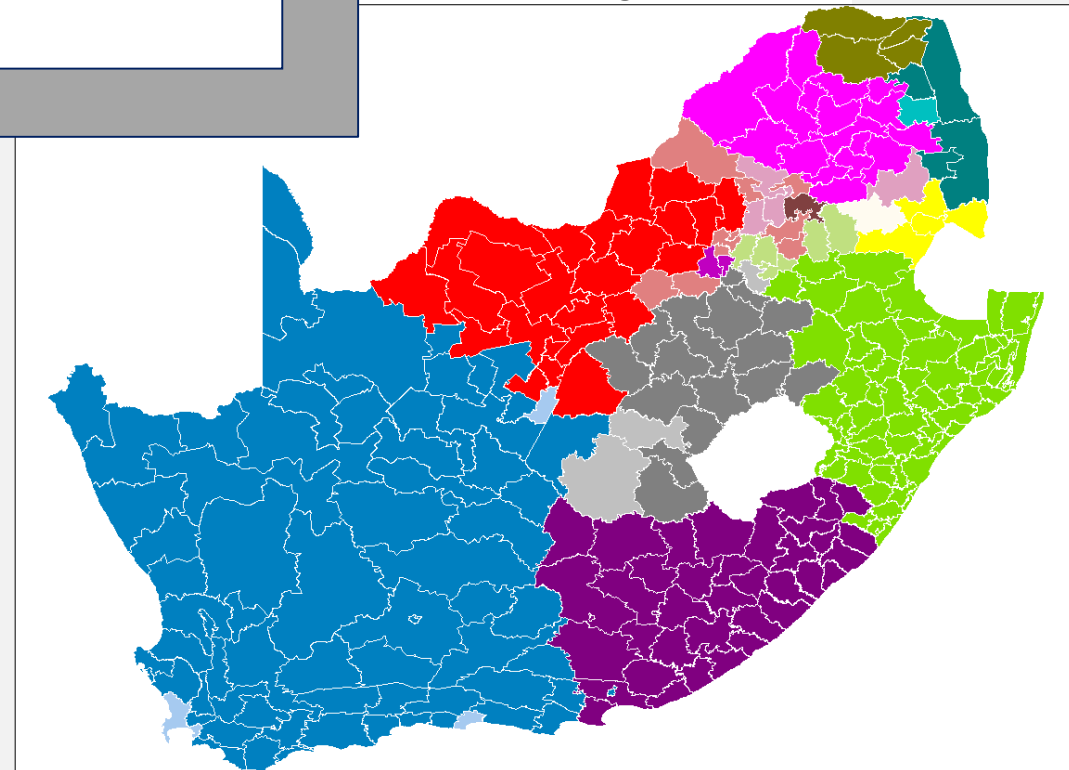
Regulation of effects of establishment of municipality on existing municipalities

14. (1) The establishment of a municipality in terms of section 12 in the area of an existing municipality supersedes the existing municipality in that area, and the new municipality becomes its successor in law with regard to that area.

inlet

prior 2006

al area comprised of,
known Town extent
of the developed and
the buildings ended



Timelines and important changes affecting The National Building Regulations

1 Building Control Officer and
1 building inspector serve the
towns of:

Clanwilliam, Citrusdal,
Lambert's bay, Eland's bay,
Graafwater, Leipoldtville,
Wupperthal, Paleisheuwel
and 1810 farms.



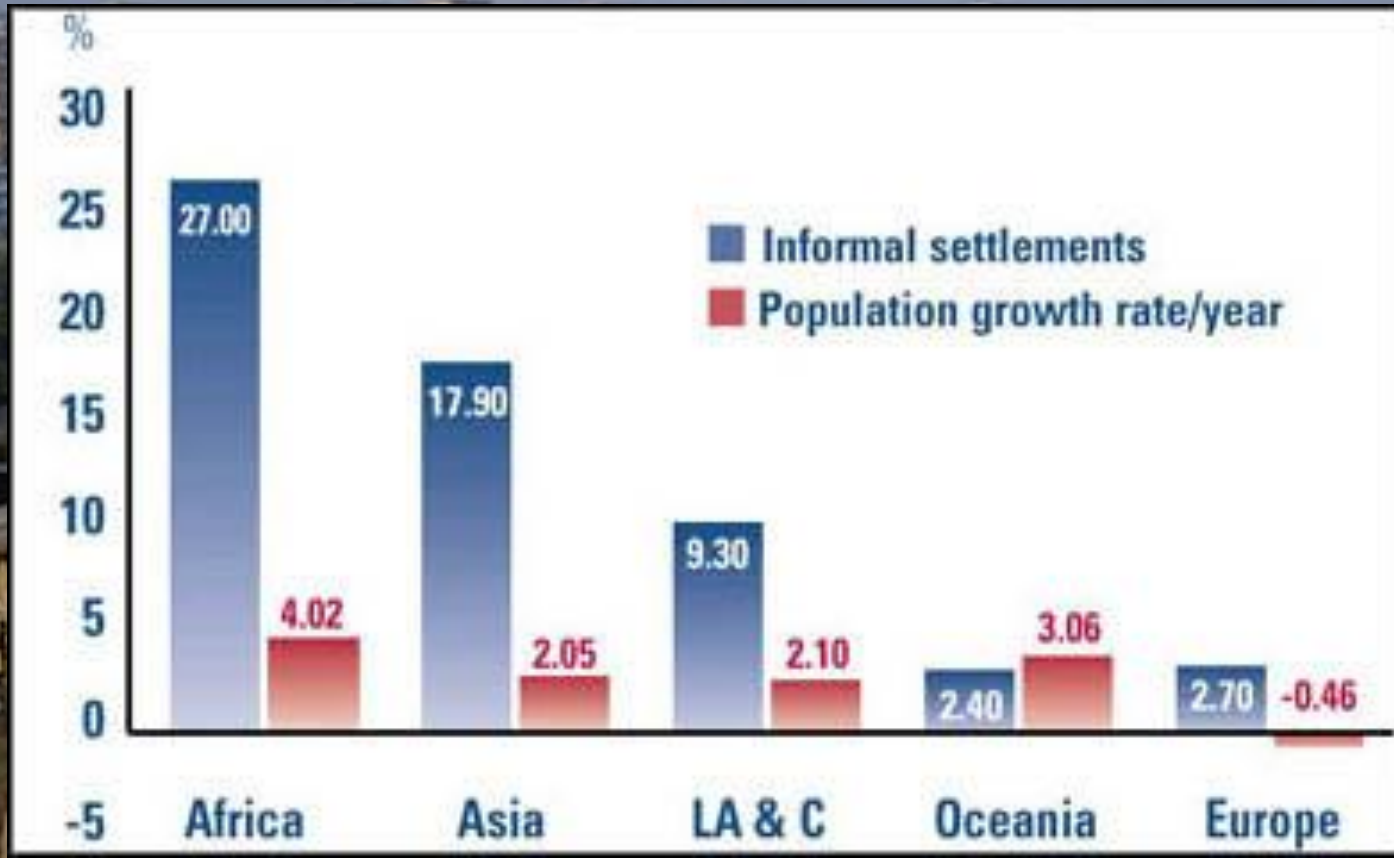
t

2006

National Building Regulations - RISKS AND CHALLENGES Now and beyond

The growth of the population outperforms the provision of housing with an estimated 249 025 units per year.

The inability to provide formal housing, stimulate the rapid increase of “INFORMAL HOUSING”



National housing shortage

National Building Regulations - RISKS AND CHALLENGES Now and beyond

The growth of the population outperforms the provision of housing with an estimated 249 025 units per year.

The inability to provide formal housing, stimulate the rapid increase of “INFORMAL HOUSING”



**Formal &
Informal**

National Building Regulations - RISKS AND CHALLENGES Now and beyond

The growth of the population outperforms the provision of housing with an estimated 249 025 units per year.

The inability to provide formal housing, stimulate the rapid increase of “INFORMAL HOUSING”



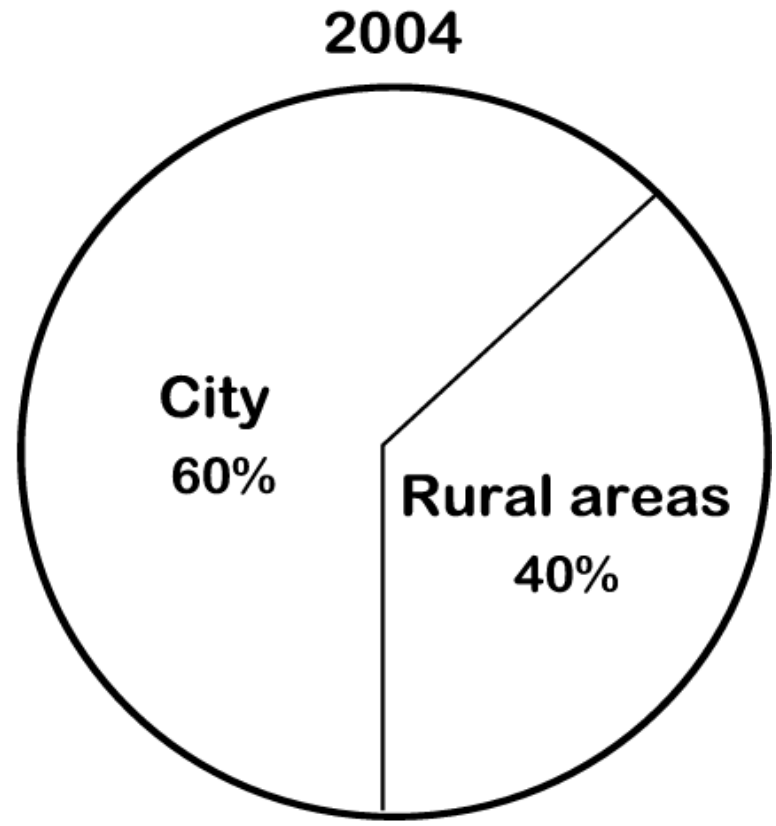
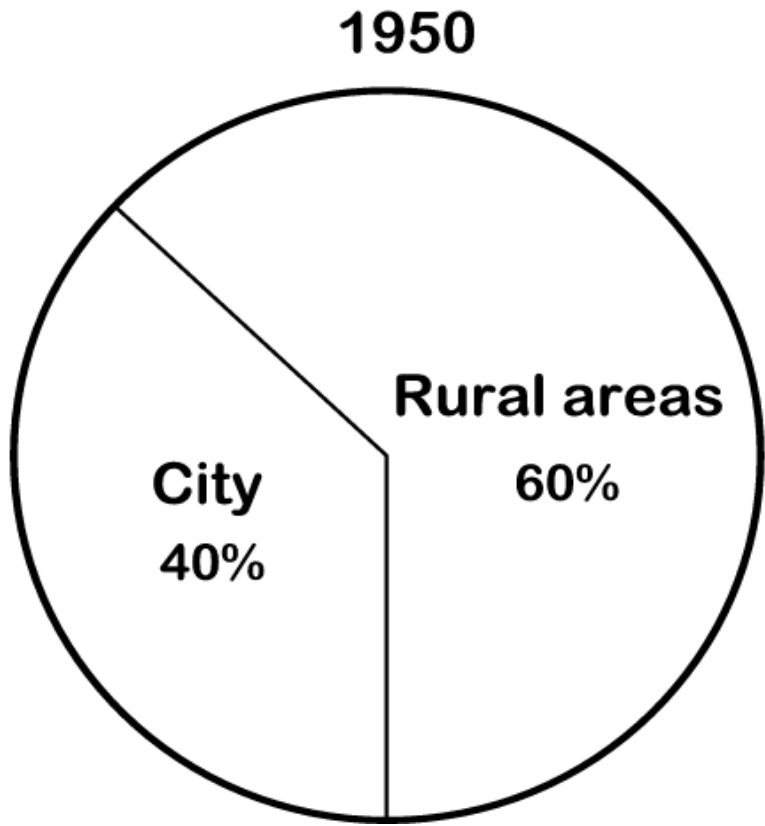
Current National Building Legislation



How do I Comply with the Building Regulations?

National Building Regulations - RISKS AND CHALLENGES Now and beyond

The growth of the population out performs the provision of housing with an estimated 249 025 units per



Building Block for Formal Enforcement



Building Block for INFORMAL Development and Enforcement



**NOT
NBR
compliant**



Value of Building – you get what you pay for:

Once upon
a time




Piglet went to the wolf's house and rescued his brothers, they were then smart enough to build their new houses out of bricks. Like Piglet. So the three little pigs lived happily ever after. The end

Value of Building – you get what you pay for:

Once upon
a time



GOVERNMENT DEPARTMENTS in CONSTRUCTION REGULATORY DASHBOARD all guided by NBR



public works
Department:
Public Works
REPUBLIC OF SOUTH AFRICA



SACAP
ECSCA



cidb
development through partnership




GRÉMENT
SOUTH AFRICA
innovative construction product assessments



the dti
Department:
Trade and Industry
REPUBLIC OF SOUTH AFRICA



NRCS | national regulator for compulsory specifications



BUILDING BENCHMARK
CODE = NBR
for CONSTRUCTION



SABS
APPROVED



National Building Regulation and Building Standards Act




human settlements
Department:
Human Settlements
REPUBLIC OF SOUTH AFRICA



NHBRC
REGISTRATION COUNCIL



Focus on Quality



basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA



ASIDI
Accelerated Schools Infrastructure Delivery Initiative

The Education Infrastructure Grant (EIG), the Equitable Share (ES) grant, and the Accelerated Schools Infrastructure Delivery Initiative (Asidi)

NBR is the overarching legislation that binds all other building activities



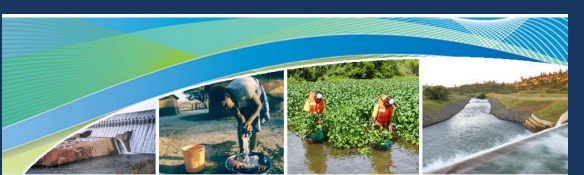
science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA




CSIR
our future through science



water affairs
Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA



GOVERNMENT DEPARTMENTS in CONSTRUCTION REGULATORY DASHBOARD all guided by NBR



public works
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REPUBLIC OF SOUTH AFRICA



SACAP
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development through partnership




AGREMENT
SOUTH AFRICA
innovative construction product assessments



the dti
Department:
Trade and Industry
REPUBLIC OF SOUTH AFRICA



NRCS | national regulator for compulsory specifications



BUILDING BENCHMARK
CODE = NBR
for CONSTRUCTION



SABS
APPROVED



BUILDING BENCHMARK
CODE = NBR
for CONSTRUCTION



**Cooperative Governance
Traditional Affairs**



SALGA
South African Local Government Association
South African Local Government Association is a listed public entity. Salga represents local government on numerous intergovernmental forums



labour
Department:
Labour
REPUBLIC OF SOUTH AFRICA

Occupational Health and Safety Act (Construction Regulations 2003)



Department of Labour – **Construction Regulations 14**



Occupational
Health and
Safety Act
(Construction
Regulations
2003)



The National Building Regulation form the South African building code: All buildings in South Africa has to comply to its minimum set requirements.

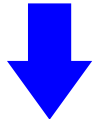


The Building, Construction and Property Industry is a large system of some R3 Trillion which is interconnected with a multitude of local and global influences affecting its development.

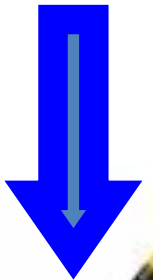
It is the second largest employer in the South African economy. This does not include the employment of professionals such as: architectural, quantity surveying and engineering.



The legislators



The regulators

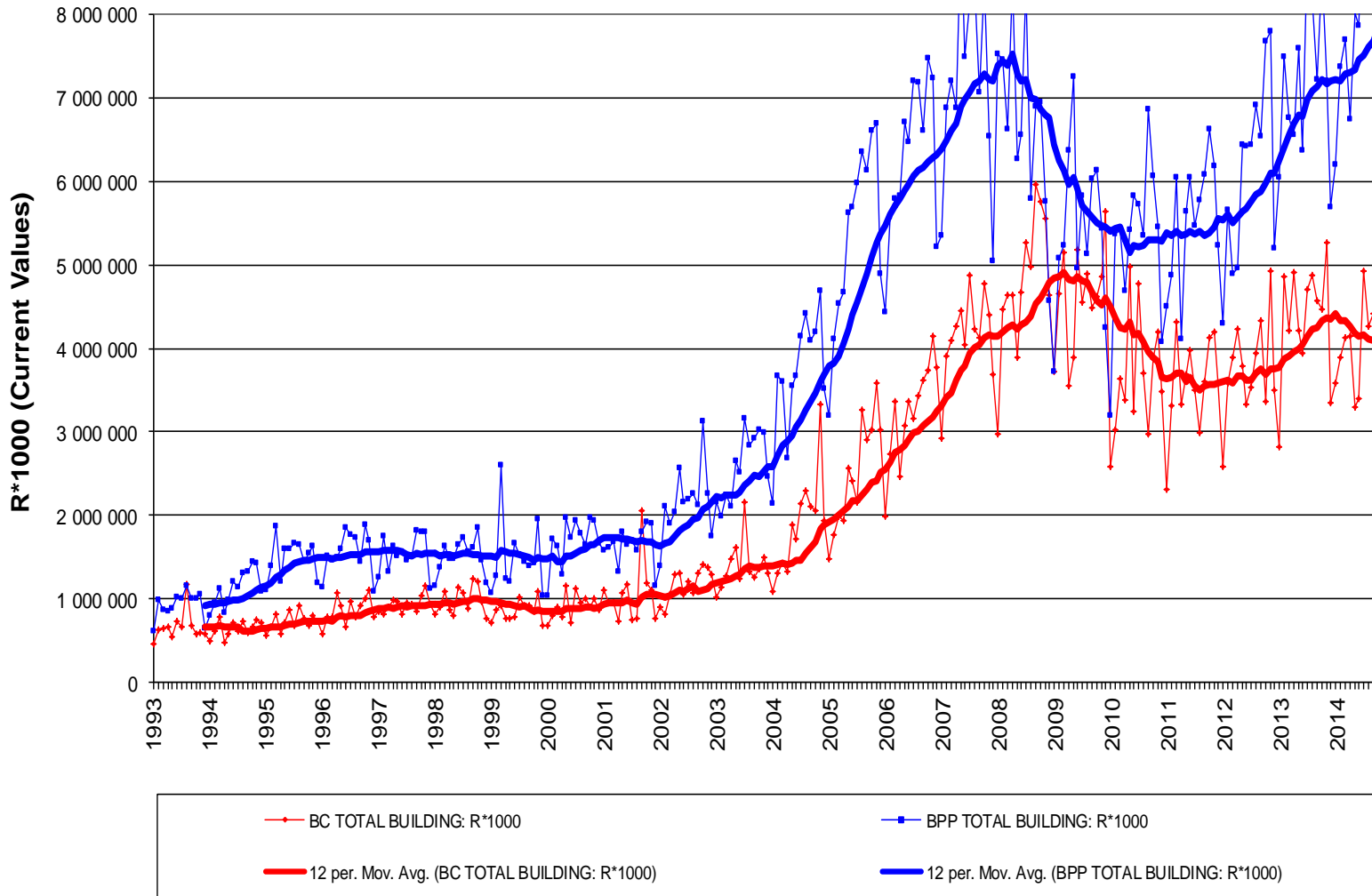


The Industry

BUILDING & CONSTRUCTION INDUSTRY - Investment

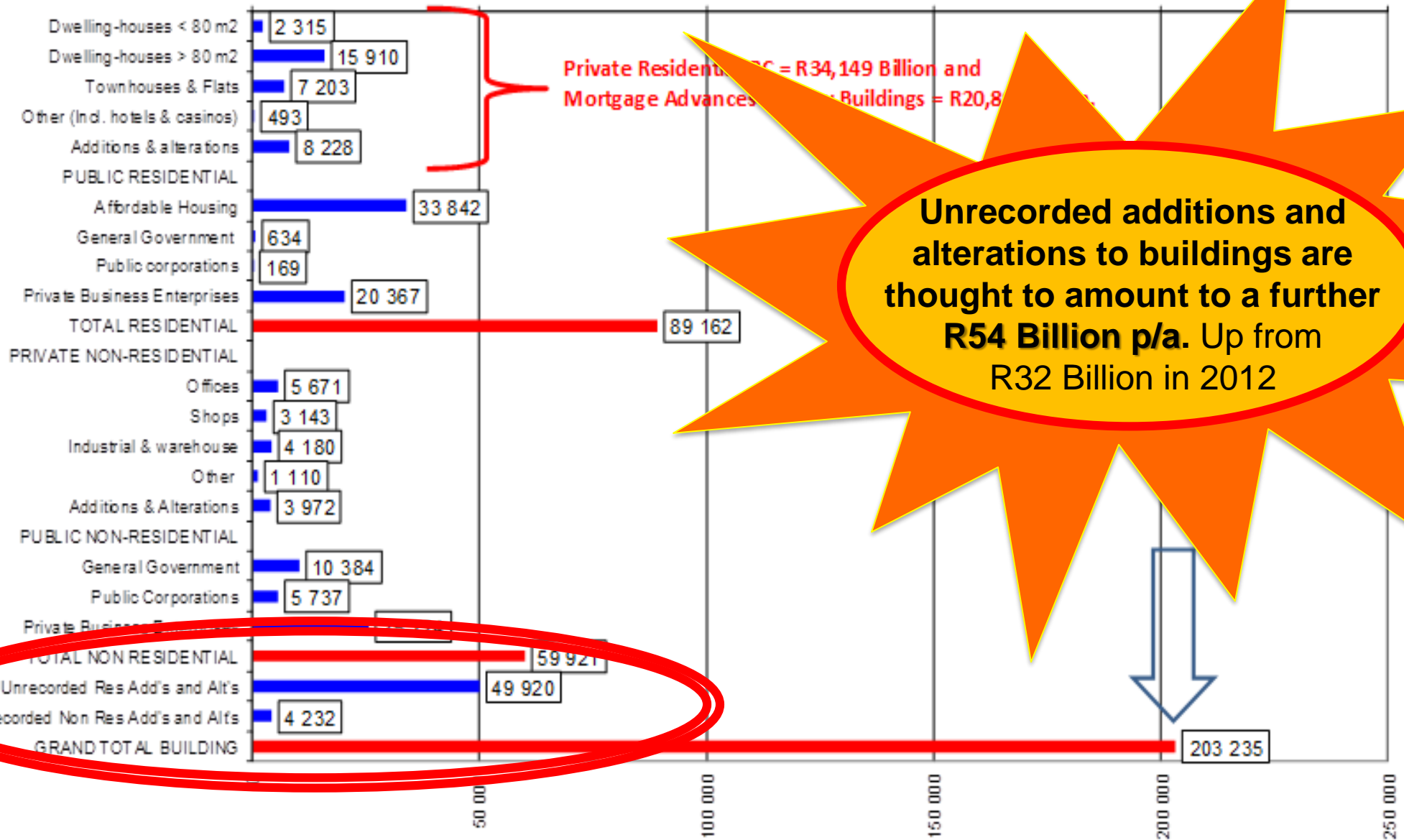


BPP & BC Total Building: 1993-2014 by month: R*1000 (Current Values) © BMI-BRSCU
 (Source: StatsSA; BMI-BRSCU: BC Total RSA by Month and Type of Building 1993-2008: TOTAL BLDNG BC&BPP R)



INVESTMENT IN BUILDING BY SECTOR AND BY SEGMENT: 2013: R MILLION (TOTAL = R203 235 MILLION)

(Source: SARB, StatsSA, MFA, BMI-BRSCU Workings)



Unrecorded additions and alterations to buildings are thought to amount to a further R54 Billion p/a. Up from R32 Billion in 2012

CURRENT REALITY OF INVESTMENT IN BUILDING
BY SECTOR AND SEGMENT: 2013 (R MILLION)



THE CODE OF HAMMURABI

– THE EARLIEST DISCOVERED LEGAL SYSTEM (BABYLONIAN DYNASTY 2000 – 323 BC)

If a builder build a house for someone, and does not construct it properly, and the house, which he built, fall and kill its owner; then that builder shall be put to death. If it kills the son of the owner, the son of that builder shall be put to death. If it ruin goods, he shall make compensation for all that has been ruined, and inasmuch as he did not construct properly this house which he built and it fell, he shall re-erect the house from his own means.



**Legislation aims
to ensure all
buildings are:
Healthy, Safe,
Structurally
Stable and
Environmentally
Sustainable**

THE CODE OF HAMMURABI

ANCIENT LEGAL
DYNASTY 2000

use for
construct
use, which
owner;
be put to
of the
builder
it ruin

at has
much as he

did not construct properly this
house which he built and it fell,
he shall re-erect the house from
his own means.

National Building Regulations : touching all building owners throughout South Africa



CONSTRUCTION



Building Plan Submission to Local Authority

SAFE HOME

BP submission

Local Authority applies the legislation:

National Building Regulations

National Building Regulations

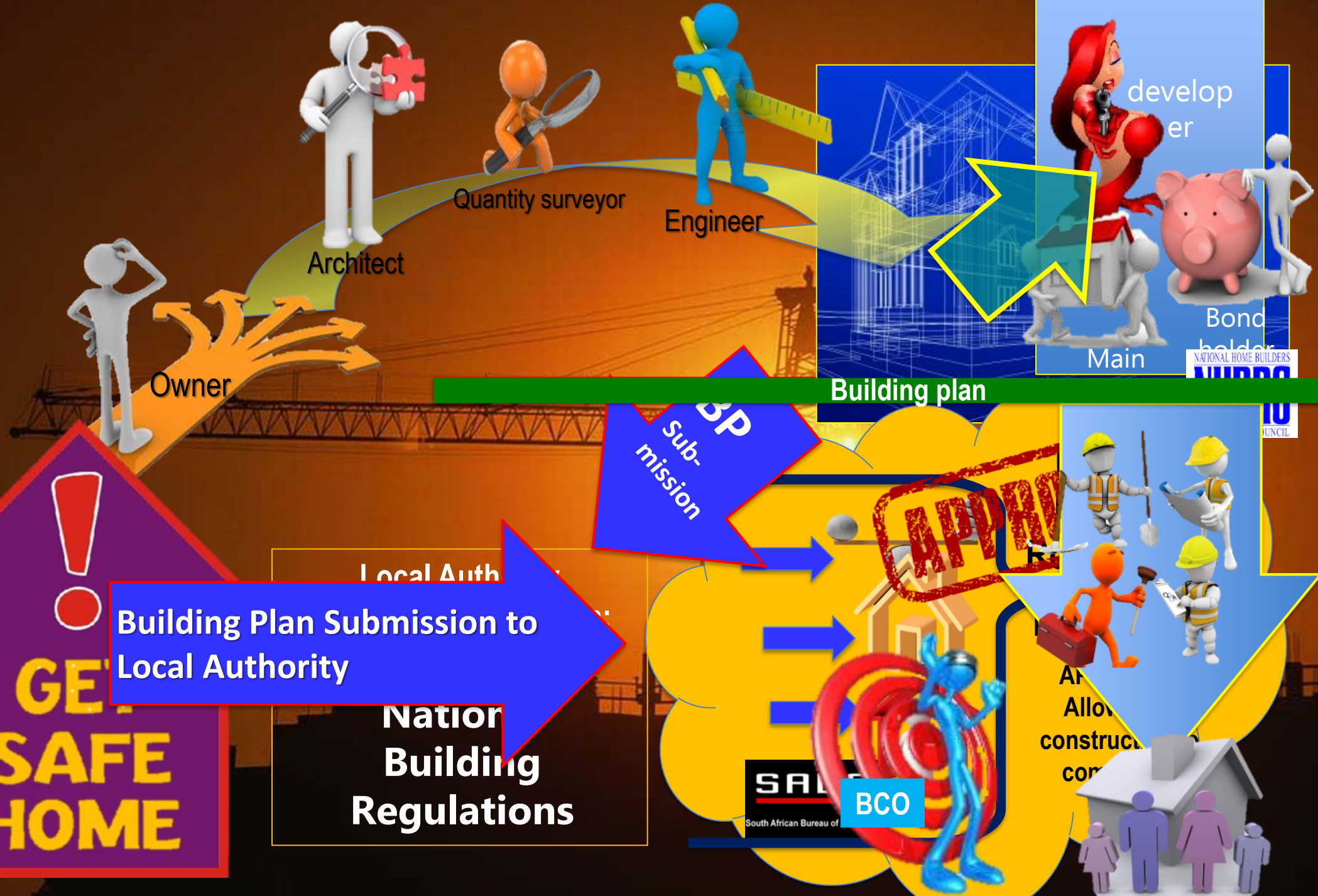
BUILDING PLAN APPROVAL

Allows for construction to commence

BCO

South African Bureau of

National Building Regulations : touching all building owners throughout South Africa



That's all Folks!

The End



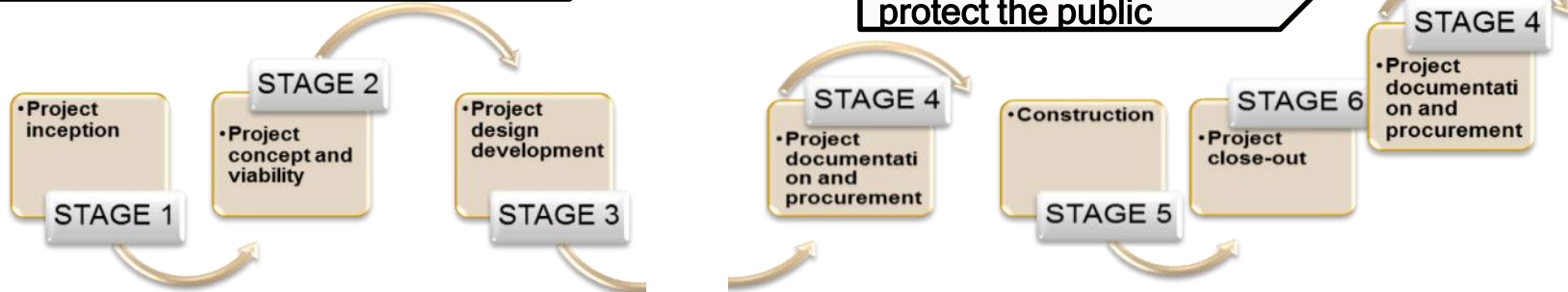


Department of Public Works

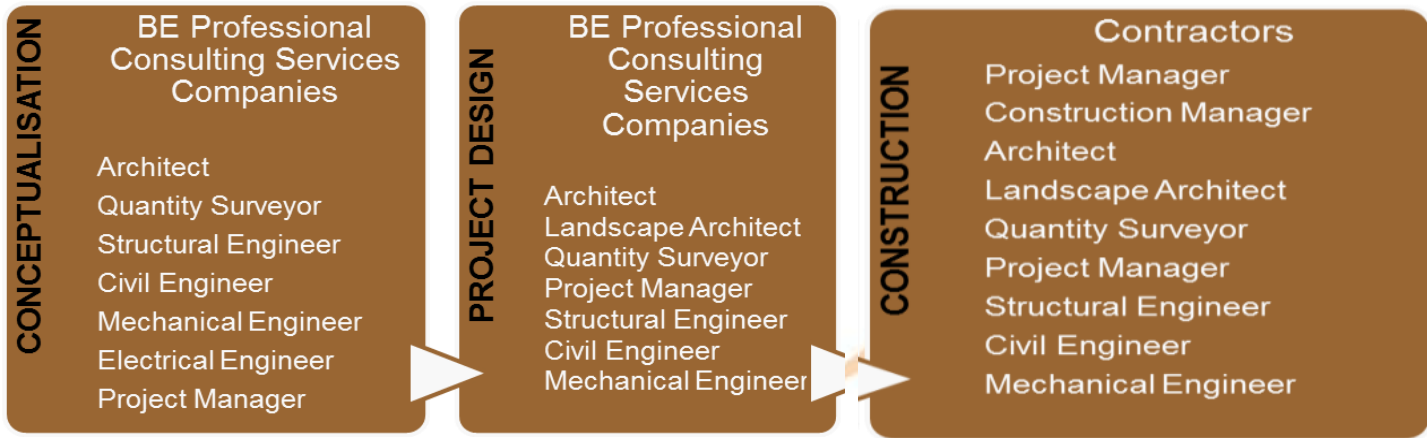
C B E

CBE policy space, regulate BEPs who conceptualise and design infrastructure to protect the public

CIDB policy space, regulate contractors who build infrastructure to protect the public



Building Environment PROFESSIONS



**Slide reproduced with kind permission of :
Ms Gugu Mazibuko
CEO; CBE**



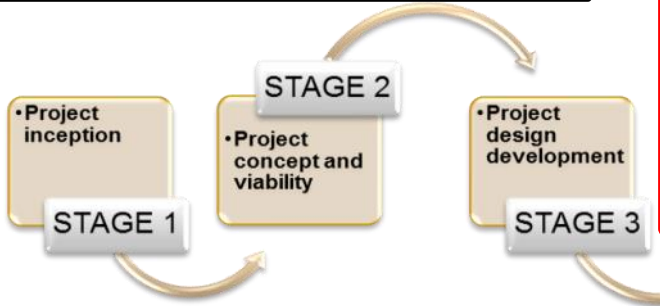
Department of Public Works

'The most terrifying words
In the English language are:

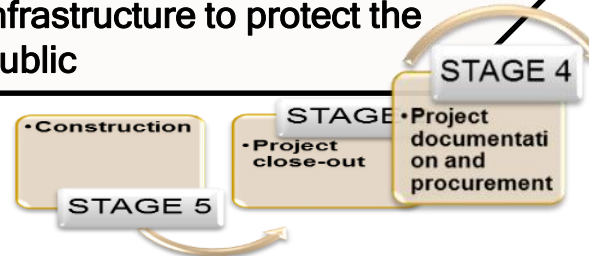
'I'm from the government
and I'm here to help.'
-Ronald Reagan

CBE policy space, regulate BEPs
who conceptualise and design
infrastructure to protect the public

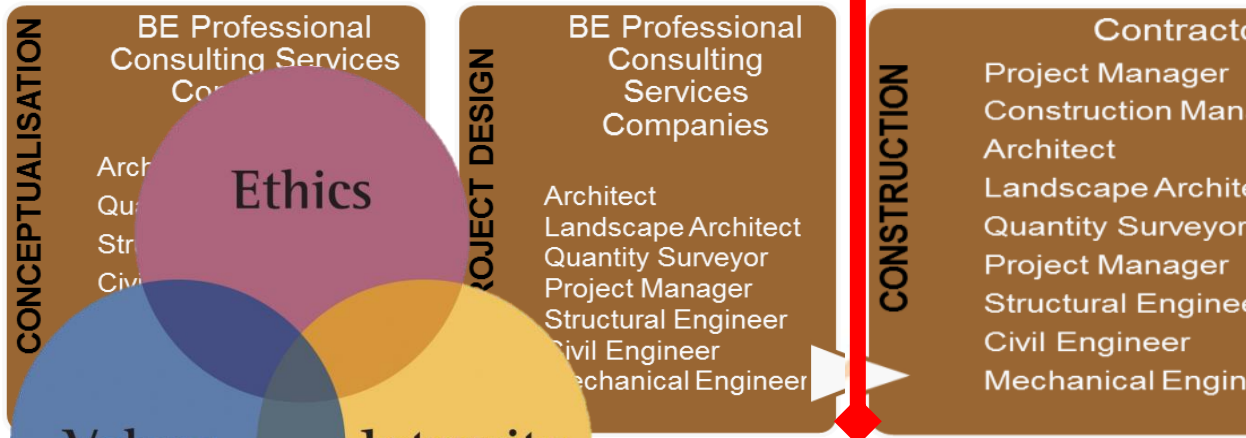
CIDB policy space, regulate
contractors who build
infrastructure to protect the
public



NBR



Building Environment PROFESSIONS

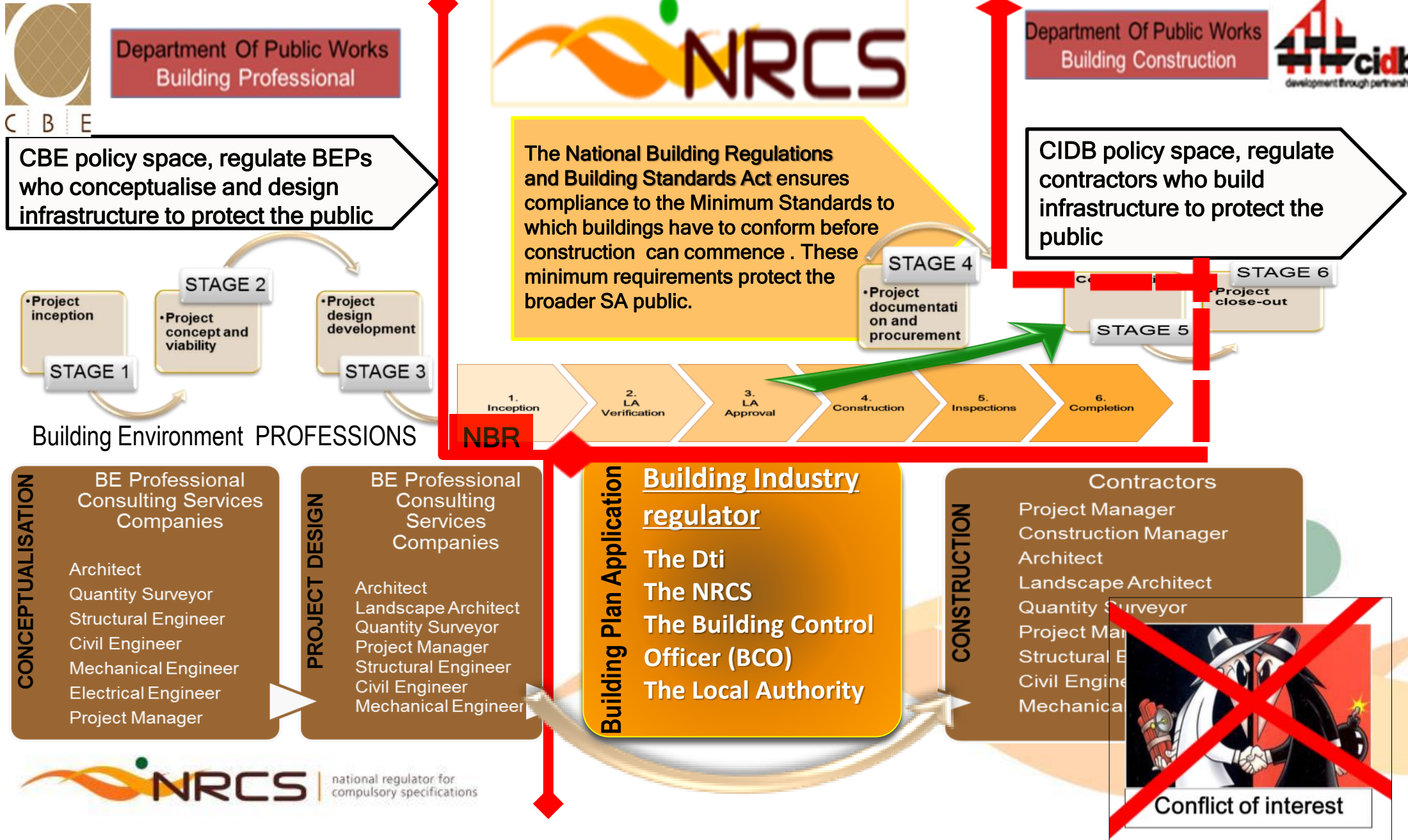


Conflict of interest

National Building Regulations Building Procedures and Processes



KEY Building Environment DESIGN PROFESSIONS AND THE STAGES OF THE CONSTRUCTION PROCESS



National Building Regulations Building Procedures and Processes

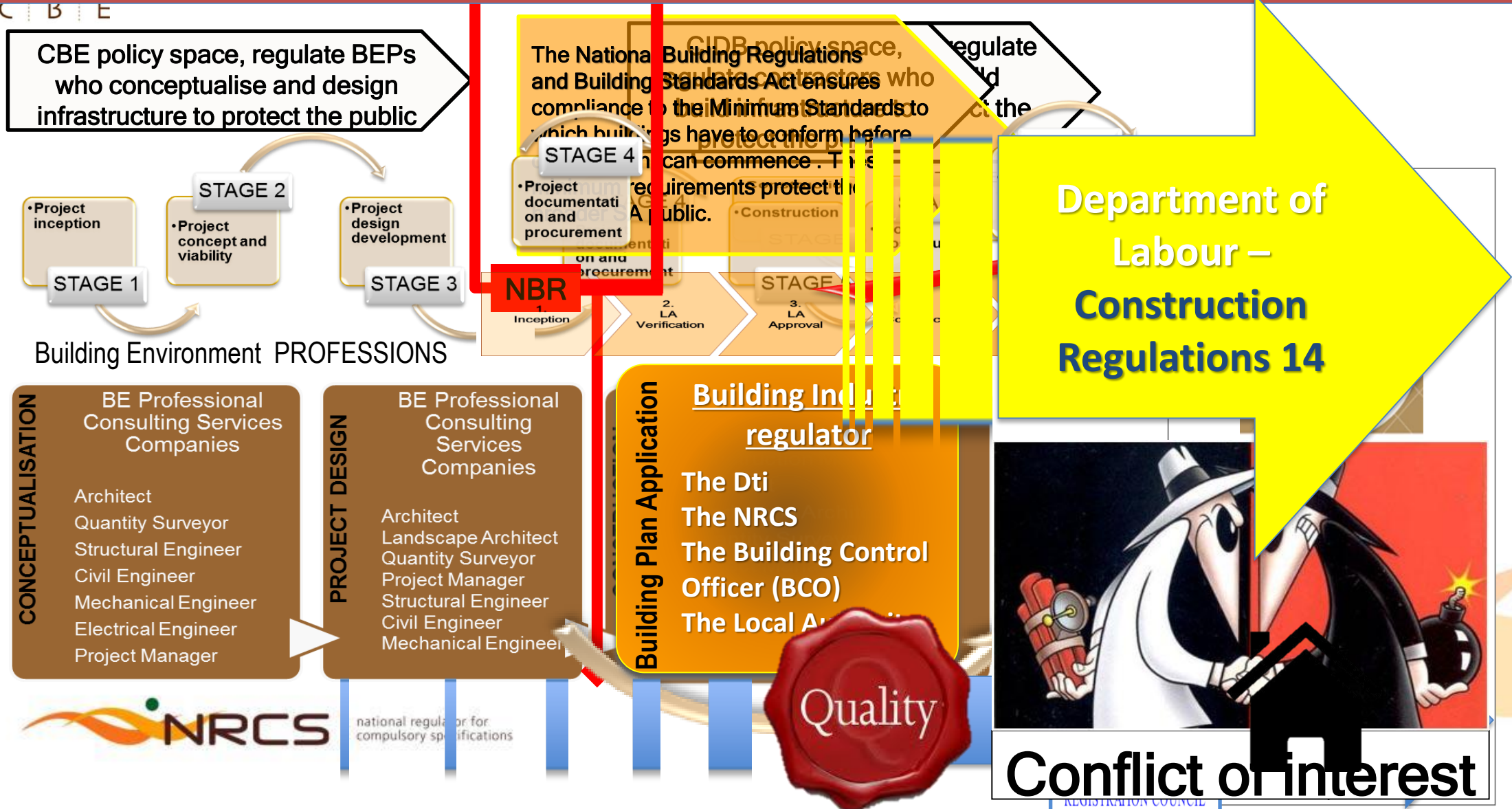


KEY Building Environment DESIGN PROFESSIONS AND THE STAGES OF THE CONSTRUCTION PROCESS





Department of Public Works



National Building Regulations Building Procedures and Processes



Concept development, Preparation of Technical drawings

1. Inception

2. LA Verification

3. LA Approval

4. Construction

5. Inspections

6. Completion



National Building Regulations Building Procedures and Processes



Concept development, Preparation of Technical drawings

A decorative graphic element consisting of several wavy lines in shades of orange and yellow, with a small green dot at the end of one of the lines.

MIT

95

Entrance

ained.

Priority

NG

DL



The Act; and the Regulations are



the Rules of the “Building Game”



To provide for the promotion of uniformity in the law relating to the erection of buildings in the area of jurisdiction of Local Authorities

1. Definitions
2. Application of Act
3. Duties of Draftsmen of Plans, Specifications, Documents and Diagrams
4. Approval by Local Authorities of Applications in Respect of Erection of Buildings
5. Appointment of Building Control Officer by Local Authority
6. Functions of Building Control Officers
7. Approval by Local Authorities in Respect of Erection of Buildings
8. Power of Court in Respect of Approval by Local Authority
9. Appeal Against Decision of Local Authority
10. Erection of Buildings in Certain Circumstances Subject to Prohibition or Conditions
11. Erection of Buildings Subject to Time Limit
12. Demolition or Alteration of Certain Buildings
13. Exemption of Buildings from National Building Regulations and Authorization for Erection Thereof
14. Certificates of Occupancy in Respect of Buildings

15. Entry by Building Control Officers and Certain Other Persons of Certain Buildings and Land
16. Report on Adequacy of Certain Measures and on Certain Building Projects
17. National Building Regulations and Directives
18. Deviation and Exemption From National Building Regulations
19. Prohibition on Use of Certain Methods or Materials
20. Regulations
21. Order in Respect of Erection and Demolition of Buildings
22. Power of Local Authorities Relating to Rates, Taxes, Fees and Other Moneys
23. Exemption from Liability
24. General Penalty Clause
25. Presumption
26. Payment of Certain Moneys to Local Authorities
27. Powers of Minister in Respect of Certain Local Authorities
28. Delegations of Powers
29. Repeal of Laws
30. Short Title and Commencement

The Act contains 28 sections



NATIONAL BUILDING REGULATIONS Act 103 of 1977

REGULATIONS

PARTS A to W VIEWED AS CHAPTERS

PART A ADMINISTRATION

- A1 Application
- A2 Plans And Particulars To Be Furnished
- A3 Preliminary Plans And Enquiries
- A4 Local Authority May Require Additional Documents And Information
- A5 Application Forms And Materials, Scales And Sizes Of Plans
- A6 Site Plans
- A7 Layout Drawing
- A8 Plumbing Installation Drawings And Particulars
- A9 Fire Protection Plan
- A10 Symbols On Fire Protection Plan
- A11 Pointing Out Of Boundary Beacons
- A12 Street Levels

- A13 Building Materials And Tests
- A14 Construction
- A15 Maintenance And Operation
- A16 Qualifications Of A Building Control Officer
- A17 Certificate Of Identity Of A Building Control Officer
- A18 Control Of Plumbers And Plumbing Work
- A19 Appointment Of Persons Responsible For Design, Inspection And Assessment Duties
- A20 Classification And Designation
- A21 Population
- A22 Notice Of Intention To Commence Erection or Demolition of A Building And Notices Of Inspection
- A23 Temporary Buildings
- A24 Standardization Of Interpretation
- A25 General Enforcement

National Building Regulations and Standards

NATIONAL BUILDING REGULATIONS AND STANDARDS

REGULATIONS

PART A ADMINISTRATION

- A1 Application
- A2 Plans And Particulars To Be Furnished
- A3 Preliminary Plans And Enquiries
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- A10 Symbols On Fire Protection Plan
- A11 Pointing Out Of Boundary Beacons
- A12 Street Levels

- A13 Building
- A14 Constr
- A15 Mainte
- A16 Qualific
- A17 Certific
- Officer
- A18 Contro
- A19 Appoin
- Design, Insp
- A20 Classifi
- A21 Popula
- A22 Notice
- or Demoliti
- Inspection
- A23 Tempo
- A24 Standa
- A25 Genera

- A Administration
- B Structural Design
- C Dimensions
- D Public Safety
- E Demolition Work
- F Site Operations
- G Excavations
- H Foundations
- J Floors
- K Walls
- L Roofs
- M Stairways
- N Glazing
- O Lighting / Ventilation
- P Drainage
- Q Alternate Sanitary Disposal
- R Storm water Disposal
- S Facilities for Disabled
- T Fire Protection
- U Refuse Disposal
- V Space Heating
- W Fire Installation
- X Sustainable Building
- Repeal - Regulations

How do we satisfy the ENERGY EFFICIENT BUILDING requirements in the National Building Regulations?

Gov.					NATIONAL BUILDING REGULATIONS Act 103 of 1977				
REGULATIONS	NRCS	GENERAL REGULATION		REGULATIONS PARTS A to W VIEWED AS CHAPTERS			PART X - Environmental Sustainability		
		Mandatory in support of the Act 103 of 1977				Chapter opens door for other environmental interventions			
		REVIEW BOARD, OTHERS	PART A – ADMINISTRATION	PART B – STRUCTURAL DESIGN	PARTS C TO W – DIMENSIONS, FOUNDATIONS, WALLS ETC, ETC		PART XA – ENERGY EFFICIENCY PART XB – WATER CONSERVATION		
STANDARDS	SABS	→ old SABS 0400	SANS 10400 – Code of Practice for the Application of the NBR's or "Deemed to satisfy" rules to satisfy the requirements set in the above mandatory REGULATIONS						
		SABS sphere of responsibility	PART A – Administration	PART B – Structural design	PARTS C to W Dimensions, Foundations, Walls etc., etc.		SANS 10400 PART XA – ENERGY EFFICIENCY OF BUILDINGS		
		OTHER SANS STANDARDS		PART B References 7 standards for different elements of structures	Other standards , e.g. SANS 10252, 10254		OTHER STANDARDS , E.G. SANS 204.		

How do we satisfy the ENERGY EFFICIENT BUILDING requirements in the National Building Regulations?



National Building Legislation

National Building Regulations and Building Standards Act

The **ACT**[®]



The **REGULATIONS**



The **“Deemed to Satisfy”**
The **REGULATION**
Rules



National Building Legislation National Building Regulations and Building

To facilitate the use of the NBR's the NBR's are supported by a set of deemed-to-satisfy rules: The SANS 10400 suite of documents called; *the Application of National Building Regulations*.

These deemed-to-satisfy provisions describe design and construction methods, materials and technical solutions, which if applied, will ensure that the building so designed and constructed will satisfy the functional requirements of the regulations.

The **ACT**[®]

The

REGULATIONS

LAW

Rule

The

“Deemed to Satisfy”
The **REGULATION**
Rules

A “regulation” is “compulsory” which is the, “thou shall”, or the LAW that has to be obeyed at all cost but a “**rule**” is NOT compulsory and therefore it is called the “**deem-to-satisfy**” rules.

Nation National Building R

To facilitate the use of the NBR's the NBR's are supported by a set of deemed-to-satisfy rules: The SANS 10400 suite of documents called; *the Application of National Building Regulations*

The AC

Legislation aims to ensure all buildings are:
Healthy, Safe,
Structurally Stable
and
Environmentally Sustainable

scribe design and construction solutions, which if applied, will ensure constructed will satisfy the functional

Rule

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"Deemed to Satisfy"
The REGULATION Rules

The S.A. National Standards 10400



The 23 National Building Regulations

PART AZ COMING IN OPERATION, DEFINITIONS AND STANDARDS

- AZ1 Coming In Operation
- AZ2 Definitions
- AZ3 Standards
- AZ4 Complying with the requirements of the NBR
- AZ5 Repeal of regulations

PART A ADMINISTRATION

- A1 Application
- A2 Plans And Particulars To Be Furnished
- A3 Preliminary Plans And Enquiries
- A4 Local Authority May Require Additional Documents
- A5 Application Forms And Materials, Scales, Sizes Of Plans
- A6 Site Plans
- A7 Layout Drawing
- A8 Plumbing Installation Drawings And Particulars
- A9 Fire Protection Plan
- A10 Symbols On Fire Protection Plan
- A11 Pointing Out Of Boundary Beacons
- A12 Street Levels
- A13 Building Materials And Tests
- A14 Construction
- A15 Maintenance And Operation
- A16 Qualifications Of A Building Control Officer
- A17 Certificate Of Identity Of A Building Control Officer
- A18 Control Of Plumbers And Plumbing Work
- A19 Appointment Of Persons Responsible For Design, Inspection And Assessment Duties
- A20 Classification And Designation
- A21 Population
- A22 Notice Of Intention To Commence Erection Or Demolition Of A Building And Notices Of Inspection
- A23 Temporary Buildings
- A24 Standardization Of Interpretation
- A25 General Enforcement

PART B STRUCTURAL DESIGN

- B1 Design Requirement

PART C DIMENSIONS

- C1 Rooms And Buildings

PART D PUBLIC SAFETY

- D1 Change In Level
- D2 Pedestrian Entrances To Parking Areas In Buildings
- D3 Ramps
- D4 Swimming Pools And Swimming Baths
- D5 Deemed-To-Satisfy Requirements

PART E DEMOLITION WORK

- E1 Demolition Of A Building
- E2 Safeguarding Of Basements
- E3 Prohibition Of Dangerous Methods
- E4 General Penalty

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- F2 Damage To Local Authorities Property
- F3 Geotechnical Site And Environmental Conditions
- F4 Preparation Of Site
- F5 Soil Poisoning
- F6 Control Of Unreasonable Levels Of Dust And Noise
- F7 Cutting Into, Laying Open And Demolishing Certain Work
- F8 Waste Material On Site
- F9 Cleaning Of Site
- F10 Builder's Shed
- F11 Sanitary Facilities

PART G EXCAVATIONS

- G1 General Stability Requirement
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PART H FOUNDATIONS

- H1 General Requirements

PART J FLOORS

- J1 General Requirements

PART K WALLS

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- K2 Water Penetration
- K3 Roof Fixing
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- K5 Deemed-To-Satisfy Requirements

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- L1 General Requirements
- L2 Fire Resistance And Combustibility
- L3 Deemed-To-Satisfy Requirements

PART M STAIRWAYS

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- M2 Fire Requirement
- M3 Deemed-To-Satisfy Requirements

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- N1 Type And Fixing Of Glazing

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- O1 Lighting And Ventilation Requirements
- O2 Special Provisions Of Natural Lighting
- O3 Approval Of Artificial Ventilation Systems
- O4 Design Of Artificial Ventilation Systems
- O5 Artificial Ventilation Plant
- O6 Testing Of Artificial Ventilation Systems
- O7 Fire Requirements

PART P DRAINAGE

- P1 Compulsory Drainage Of Buildings
- P2 Design Of Drainage Installations
- P3 Control Of Objectionable Discharge
- P4 Industrial Effluent
- P5 Disconnections
- P6 Unauthorised Drainage Work
- P7 Inspection And Testing Of Drainage Installations

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- Q2 Permission
- Q3 Construction, Siting And Access

PART R STORMWATER DISPOSAL

- R1 Stormwater Disposal Requirement
- R2 Saving

PART S FACILITIES FOR PERSONS WITH DISABILITIES

- S1 Application
- S2 Facilities To Be Provided
- S3 Deemed-To-Satisfy Requirements

PART T FIRE PROTECTION

- T1 General Requirements
- T2 Offences

PART U REFUSE DISPOSAL

- U1 Provision Of Areas
- U2 Access To Areas
- U3 Refuse Chutes

PART V SPACE HEATING

- V1 Design, Construction And Installation

PART W WATER

- W1 Fire Installations
- W2 Supply Of Water
- W3 Design Of Fire Installations
- W4 Deemed-To-Satisfy Requirements

Part X: Environmental sustainability

REGULATION XA: Energy usage in buildings

- XA1 Use of Energy in buildings
- XA2 Hot water heating requirement
- XA3 Deemed-To-Satisfy Requirements

A time to ask those questions not yet answered

Q&A

You have

Questions

We have

Answers

Contact details

Rudolf Opperman
National Regulator Compulsory Specifications
Technical Advisor: Architecture and National
Building Regulations
e-mail: oppermrw@nrccs.org.za



The NATIONAL BUILDING REGULATIONS

: Act 103 of 1977

Part 2 of 2

To provide for the promotion of uniformity in the law relating to the erection of buildings in the area of jurisdiction of Local Authorities by prescribing building standards

New Energy Regulations to be introduced soon.....

National Legislation

National Building Regulations and Building Standards Act



Part of National Building Regulations

B: Structural Design

C: Dimensions

D: Public Safety

F: Site Operations

G: Excavations

H: Foundations

J: Floors

K: Walls

Location of deemed-to-satisfy requirements

SANS 10400-B, *Structural design*

SANS 10400-C, *Dimensions*

SANS 10400-D, *Public safety*

SANS 10400-F, *Site operations*

SANS 10400-G, *Excavations*

SANS 10400-H, *Foundations*

SANS 10400-J, *Floors*

SANS 10400-K, *Walls*

SANS 10400-L, *Roofs*

SANS 10400-M, *Stairways*

SANS 10400-N, *Escalators*

SANS 10400-O, *Lifts*

SANS 10400-P, *Signage*

SANS 10400-Q, *Non-water-borne means of sanitary disposal*

SANS 10400-R, *Stormwater disposal*

SANS 10400-S, *Facilities for persons with disabilities*

SANS 10400-T, *Fire protection*

SANS 10400-U, *Fire alarm systems*

SANS 10400-V, *Space heating*

SANS 10400-W, *Fire installation*

SANS 10400-X, *Sustainable Buildings*

SANS 10400-Y, *Other*

National Regulation
MINIMUM REQUIREMENTS
- part of the legislation

SANS 10400 - Building Code
"deemed to satisfy" the regulations
- minimum requirements
- one of three voluntary solutions on offer

Q: Non-water-borne Means of Sanitary Disposal

R: Stormwater Disposal

S: Facilities for Persons with Disabilities

T: Fire Protection

V: Space Heating

W: Fire Installation

X: Sustainable Buildings

SANS 10400-Q, *Non-water-borne means of sanitary disposal*

SANS 10400-R, *Stormwater disposal*

SANS 10400-S, *Facilities for persons with disabilities.*

SANS 10400-T, *Fire protection*

SANS 10400-V, *Space heating*

SANS 10400-W, *Fire installation*

SANS 10400-X, *Sustainable Buildings*

SANS 10400-Y, *Other*

National Building Regulations and Building Standards Act

National Legislation

National Building Regulations and Building Standards Act



Part of National Building Regulations

B: Structural Design
C: Dimensions
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F: Site Operations
G: Excavations
H: Foundations
J: Floors
K: Walls
L: Roofs
M: Stairways
N: Glazing
O: Lighting and Ventilation
P: Drainage
Q: Non-water-borne Means of Sanitary Disposal
R: Stormwater Disposal
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V: Space Heating
W: Fire Installation
X: Sustainable Buildings
 XA: Efficient Energy use in Buildings

Location of deemed-to-satisfy requirements

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SANS 10400-L, *Roofs*
SANS 10400-M, *Stairways*
SANS 10400-N, *Glazing*
SANS 10400-O, *Lighting and ventilation*
SANS 10400- P, *Drainage*
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SANS 10400-R, *Stormwater disposal*
SANS 10400-S, *Facilities for persons with disabilities.*
SANS 10400-T, *Fire protection*
SANS 10400-V, *Space heating*
SANS 10400-W, *Fire installation*
SANS 10400-X, *Sustainable Buildings*
SANS 10400-XA *Efficient Energy use in Buildings*

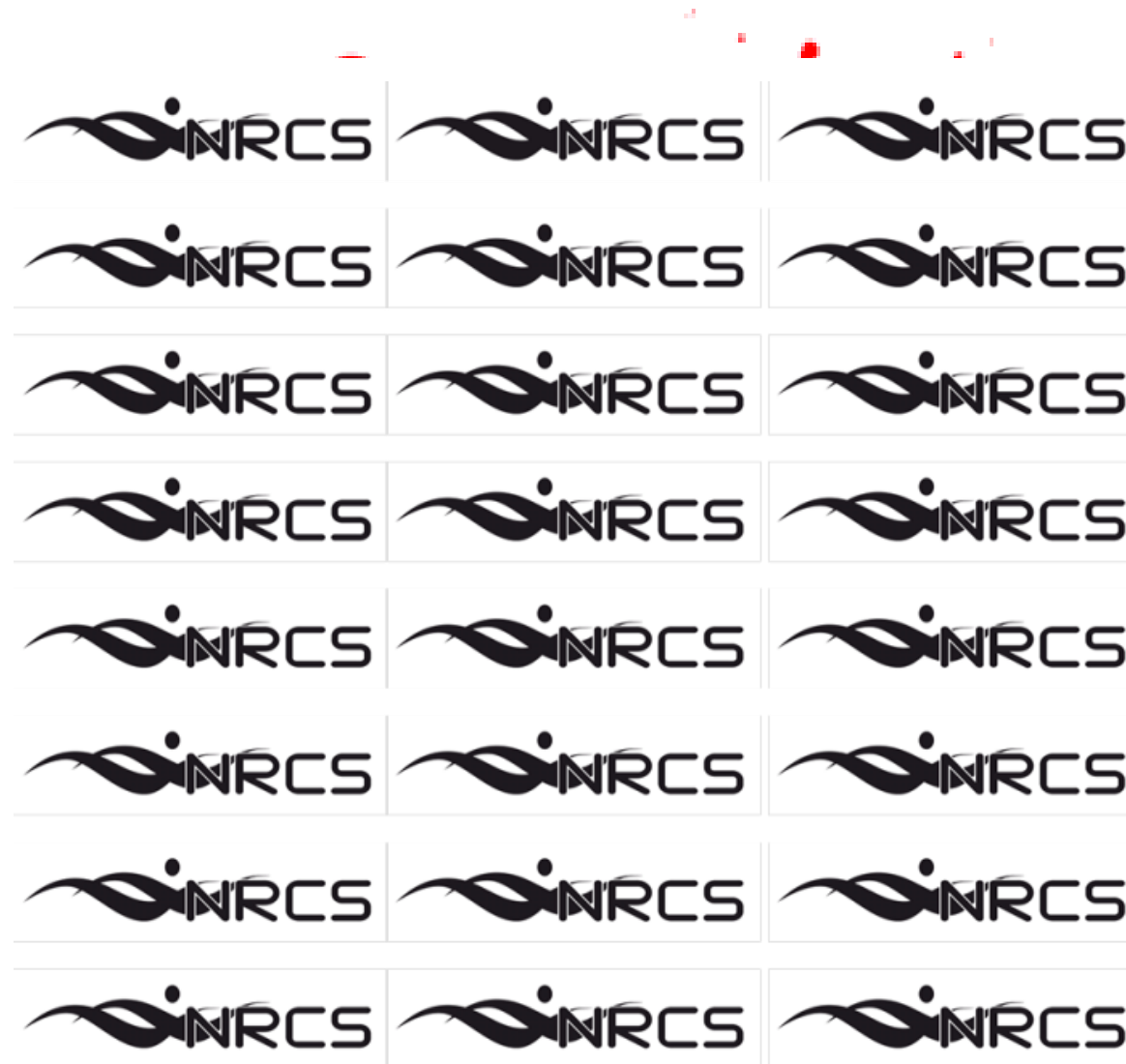
National Legislation

National Building Regulations and Building Standards Act



Part of National Building Regulations

- B: Structural Design
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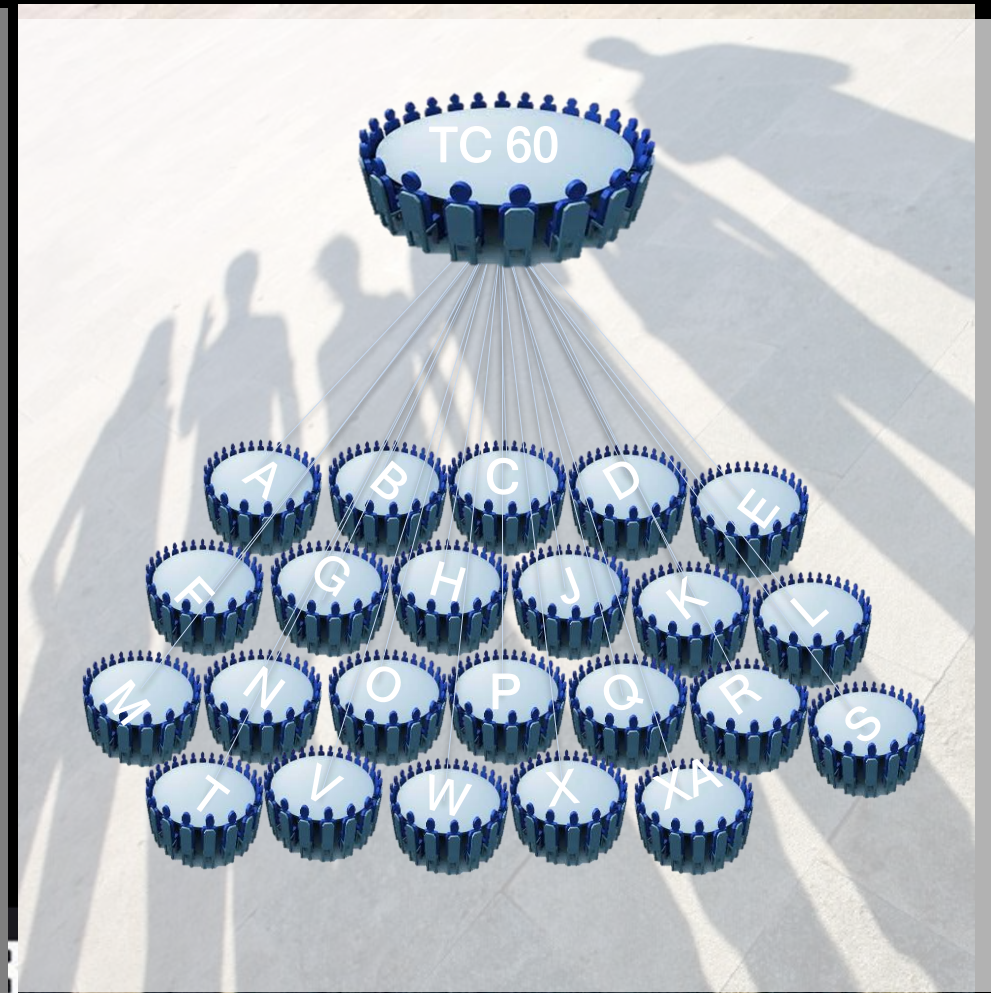
National Legislation

National Building Regulations and Building Standards Act



Location of deemed-to-satisfy requirements

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- SANS 10400-XA *Efficient Energy use in Buildings*



National Legislation

National B



- Part of
- B: Stru
- C: Dim
- D: Pub
- F: Site
- G: Exc
- H: Fou
- J: Floo
- K: Wal

N
MINI

- Q: Nor
- Dispos
- R: Stor
- S: Fac
- T: Fire
- V: Spa
- W: Fire
- X: Sus



S A E

SANS 10400 developed by
Technical Committees
comprising of industry specialists

National Building Regulations and

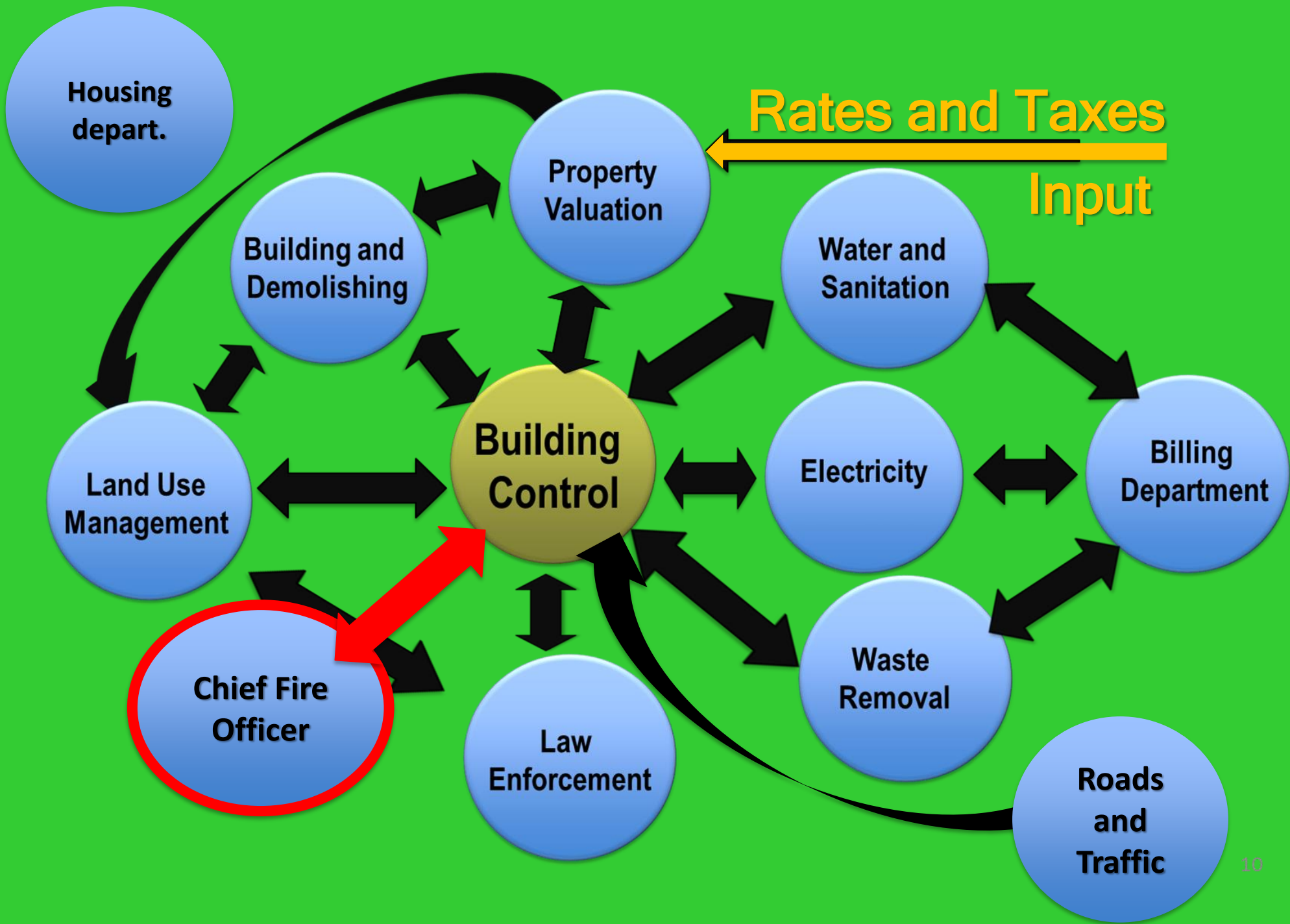
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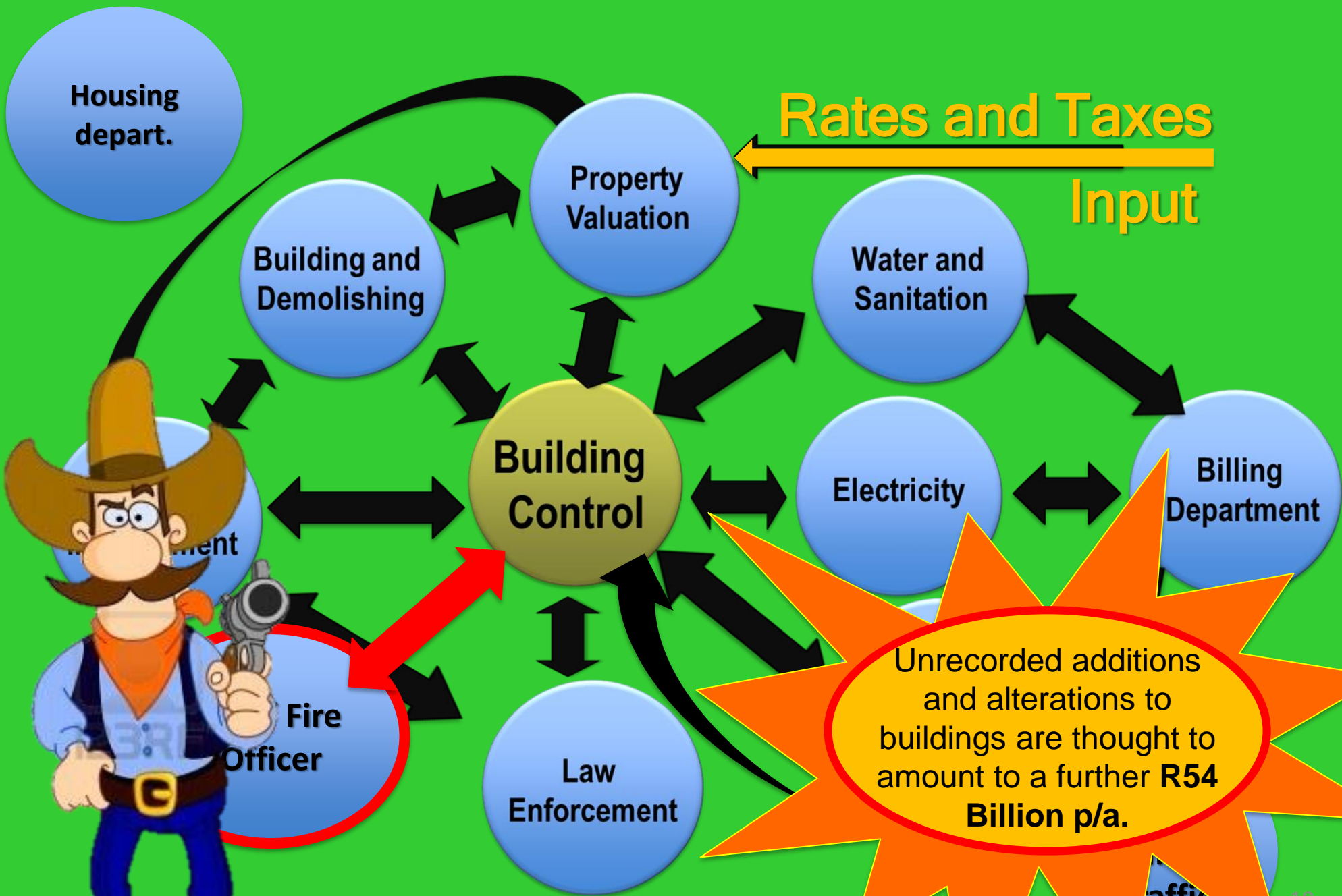
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of sanitary

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Unrecorded additions and alterations to buildings are thought to amount to a further **R54 Billion p/a.**



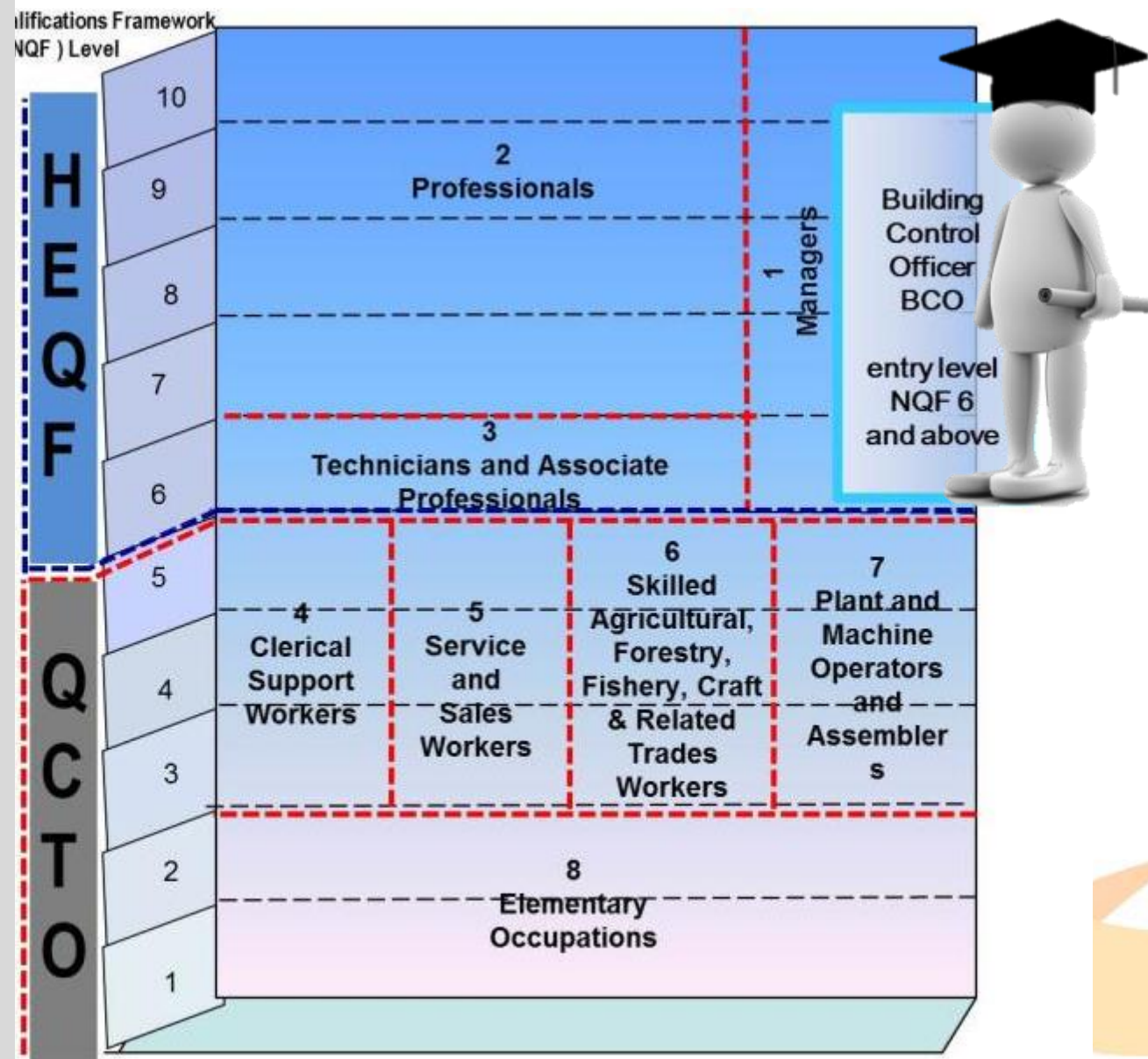
National Legislation

Minimum Qualification of a Building Control Officer



NEQF LEVELS

- NQF level 10 - Doctoral Degree
- NQF level 9 - Master's Degree - Architect
- NQF level 8 - Postgraduate Diploma
- NQF level 8 - Bachelor Honours Degree
- NQF level 8 - Bachelor's Degree (4 years)
- NQF level 7 - Bachelor's Degree (3 years)
- NQF level 7 - Advanced Diploma
- NQF level 6 – Diploma (BCO)
- NQF level 6 - Advanced Certificate
- NQF level 5 - Higher Certificate
- NQF level 4 – NSC + NC (V)
- NQF level 3 – NSC - Matric



Occupational qualifications within the Major Groups of the OFO broadly mapped against the NQF levels¹⁴



REGULATION A16: QUALIFICATIONS OF A BUILDING CONTROL OFFICER

The **minimum qualification** of any building control officer appointed in terms of section 5 of the Act **shall** be of a standard equivalent to a senior certificate plus **three years tertiary education (diploma)**, at an accredited educational institution, in one of the following **building disciplines**:

- (a) civil engineering;
- (b) structural engineering;
- (c) architecture;
- (d) building management;
- (e) building science;
- (f) building surveying; or
- (g) quantity surveying



Two separate powers and competencies of Local Government's Development Control

BUILDING

National legislation

National Building Regulations

The NBR is a National Act which regulates technical standards throughout the whole of the Republic of South Africa. The intention of the legislator is clearly to put forward a uniform set of rules and standards which must be applied on a national level. The National Building Regulations deals with *"the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities"*

The provisions to regulate the industry is made up of the components of a building:

Administration, Structural Design, Dimensions, Public Safety, Demolition Work, Site Operations, Excavations, Foundations, Floors, Walls, Roofs, Stairways, Glazing, Lighting & Ventilation, Drainage, Alternate Sanitary Disposal, Storm water Disposal, Facilities for Disabled, Fire Protection, Refuse Disposal, Space Heating, Fire Installation, Sustainable Building.

PLANNING

Provincial Ordinance

Town planning and Townships Ordinance

Local Authority to draw up a Town Planning scheme for the purpose of providing:

Coordinated and harmonious development of the area to which it relates in such a way as will most effectively tend to promote the health, safety, good order, amenity, convenience and general welfare of such area as well as efficiently and economy in the process of such development.

The scheme clauses may contain provisions;

- Max number buildings may be erected on a stand
- Max area of any erf upon which buildings may be erected.
- Open spaces around buildings including parking.
- Position of Buildings on erf irt. Boundary and street.
- Character, height, coverage, harmony, design or external appearance.
- Prohibition or control of the erection of buildings within an area which is subject to flooding
- The floor area of buildings
- The ration between the area of the erf and upon which a building is to be erected and the area of the building.

Two separate powers and competencies of Local Government's Development Control

BUILDING

National legislation



Sustainable Building.

PLANNING

Provincial Ordinance



building.

Two separate powers and competencies of Local Government's Development Control

BUILDING

National legislation



Sustainable Building.

PLANNING

Provincial Ordinance



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building.

Complying with the requirements of the National Building Regulations

Regulation AZ 4



Complying with the requirements of the National Building Regulations

Regulation AZ 4

LEVEL 1
Objective

LEVEL 2
Functional statement

LEVEL 3
Performance requirement

LEVEL 5
Deemed-to-satisfy rules

LEVEL 4
Performance based Compliance methods:
-testing
-assessment
-application of well established engineering principles

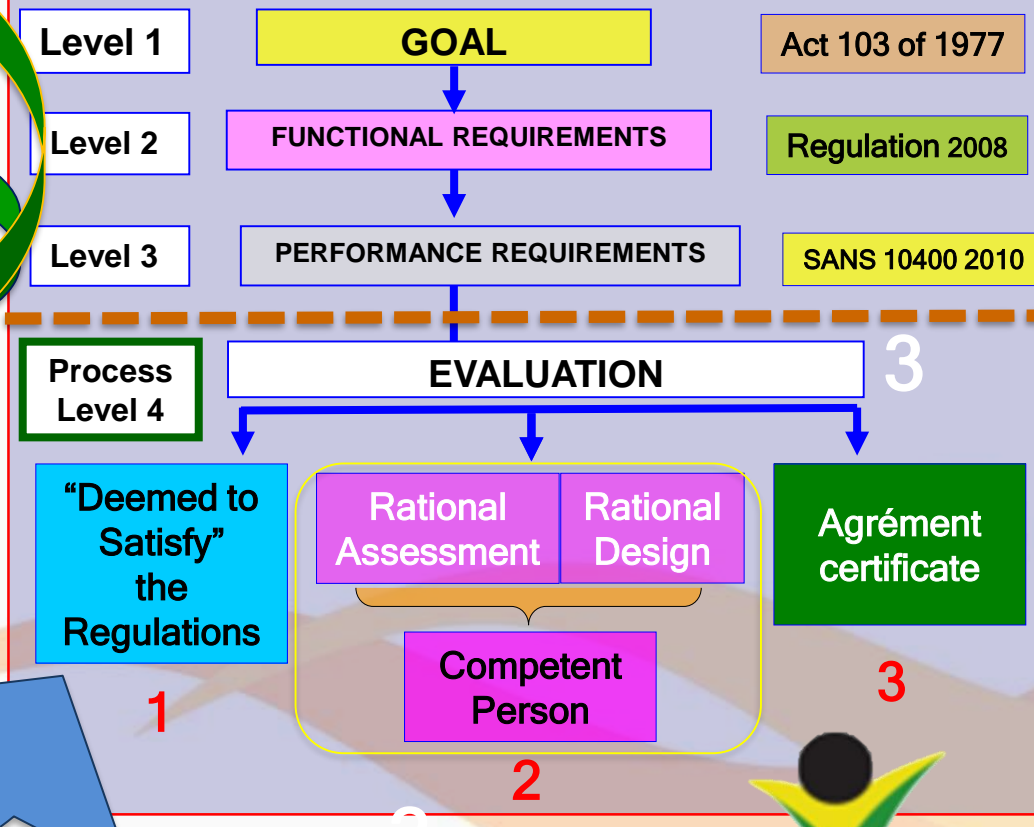
Regulation AZ 4

The requirements of the National Building Regulations shall be complied with by:

- 1(a) adhere to the requirements of all the prescriptive regulations; and
- 1(b) satisfy all functional regulations by:
 - (i) adopting building solutions that comply with the requirements of the relevant part of SANS 10400 or
 - (ii) reliably demonstrating, or predicting with certainty, to the satisfaction of the appropriate local authority, that an adopted building solution has an equivalent or superior performance to a solution that complies with the requirements of the relevant part of SANS 10400.

SOLUTIONS TO SATISFY THE REGULATIONS

PERFORMANCE BASED REGULATIONS



1

1

2

3



Complying with the requirements of the National Building Regulations

Regulation AZ 4



Complying with the requirements of the National Building Regulations

Regulation AZ 4

LEVEL 1
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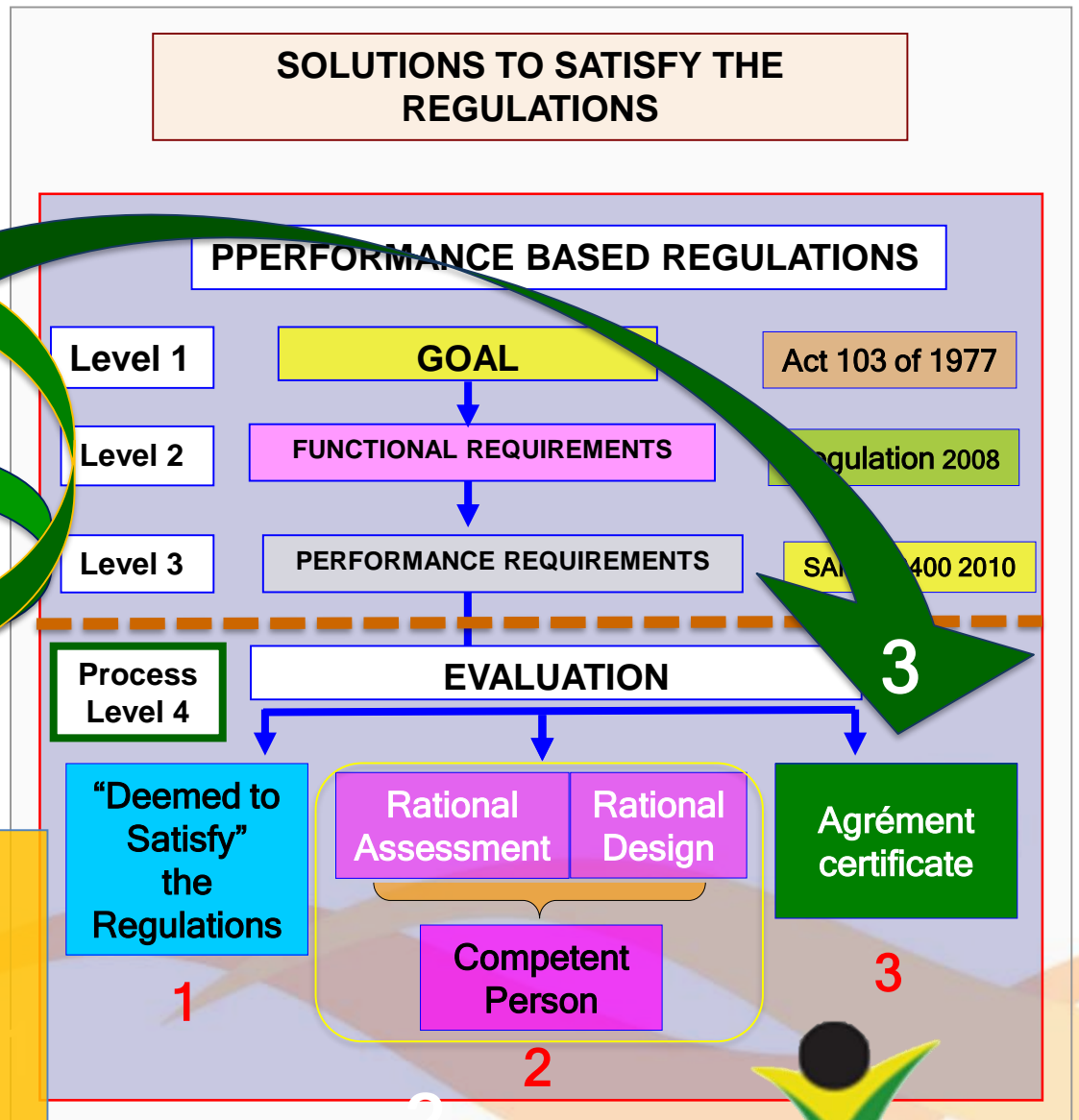
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"Agrément certificate" means a certificate that confirms fitness-for-purpose of a non-standardized product, material or component or the acceptability of the related non-standardized design and the conditions pertaining thereto (or both) issued by the Board of Agrément South Africa;



Complying with the requirements of the National Building Regulations

Regulation AZ 4



Complying with the requirements of the National Building Regulations

Regulation AZ 4

LEVEL 1
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The requirements of the National Building Regulations shall be complied with by:

- 1(a) adhering to the requirements of all the prescriptive regulations; and
- 1(b) satisfying all functional regulations by:
 - (i) adopting building solutions that comply with

"rational design"

means any design by a competent person involving a process of reasoning and calculation and which may include a design based on a standard or other suitable document;

Regulation A19

APPOINTMENT OF PERSONS RESPONSIBLE FOR DESIGN, INSPECTION AND ASSESSMENT DUTIES

Where a rational design or rational assessment, is required:

The **"competent person"** is to prove to the Local Authority that he is competent to perform such rational design.

The competent person has to demonstrate in form 2 that he/she is;

- registered,
- qualified by virtue of his education,
- training,
- experience and
- contextual knowledge

to make a determination regarding the performance of a building

"competent person"

means a person who is qualified by virtue of his **education, training, experience and contextual knowledge** to make a determination regarding the performance of a building or part thereof **in relation to a functional regulation** or to undertake such duties as may be assigned to him in terms of these regulations;

Complying with the requirements of the National Building Regulations

Regulation AZ 4



Complying with the requirements of the National Building Regulations

Regulation AZ 4

LEVEL 1
Objective

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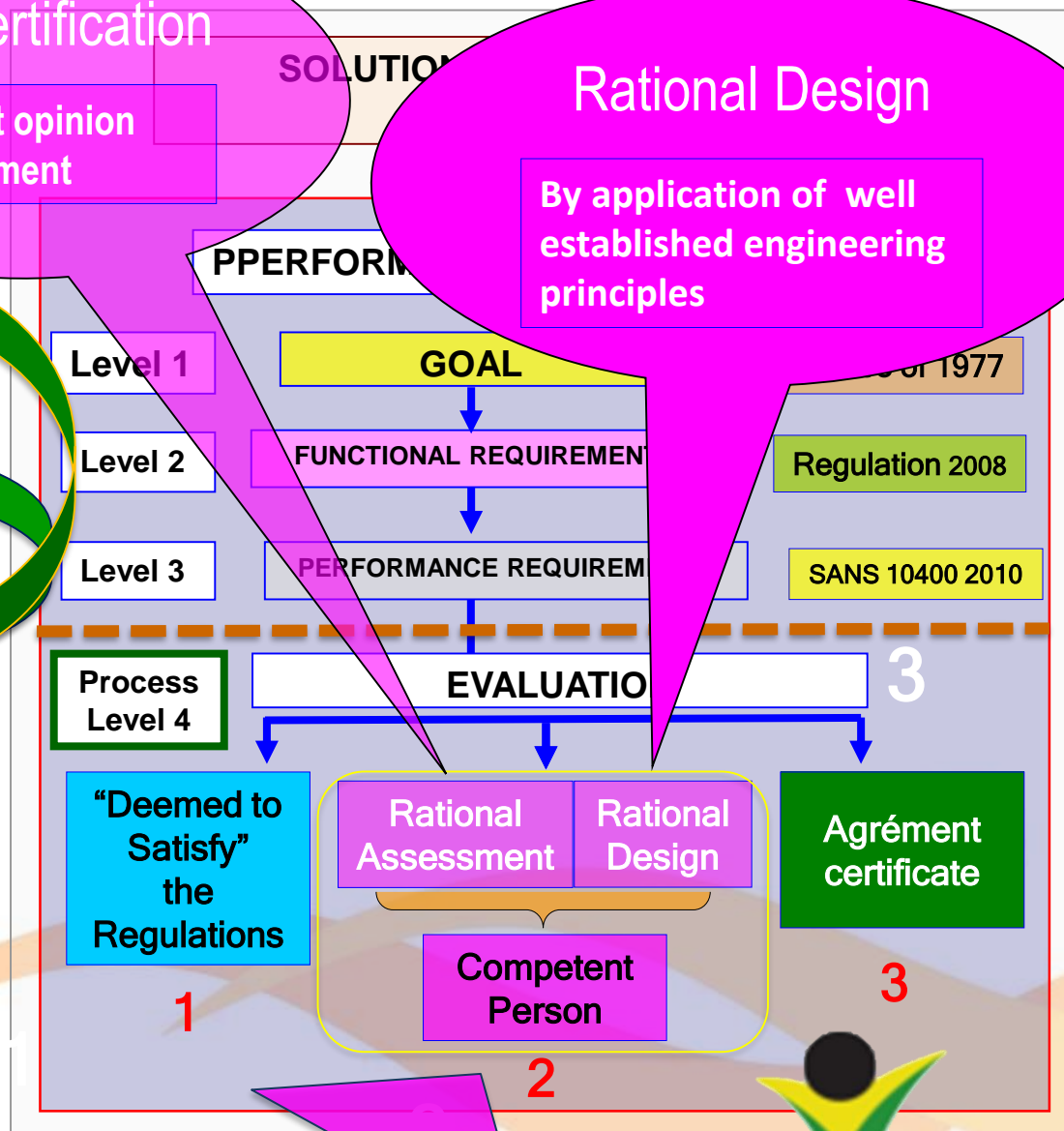
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Peer certification

By expert opinion and judgment

Rational Design

By application of well established engineering principles



Complying with the requirements of the National Building Regulations

Regulation AZ 4



Complying with the requirements of the National Building Regulations

Regulation AZ 4

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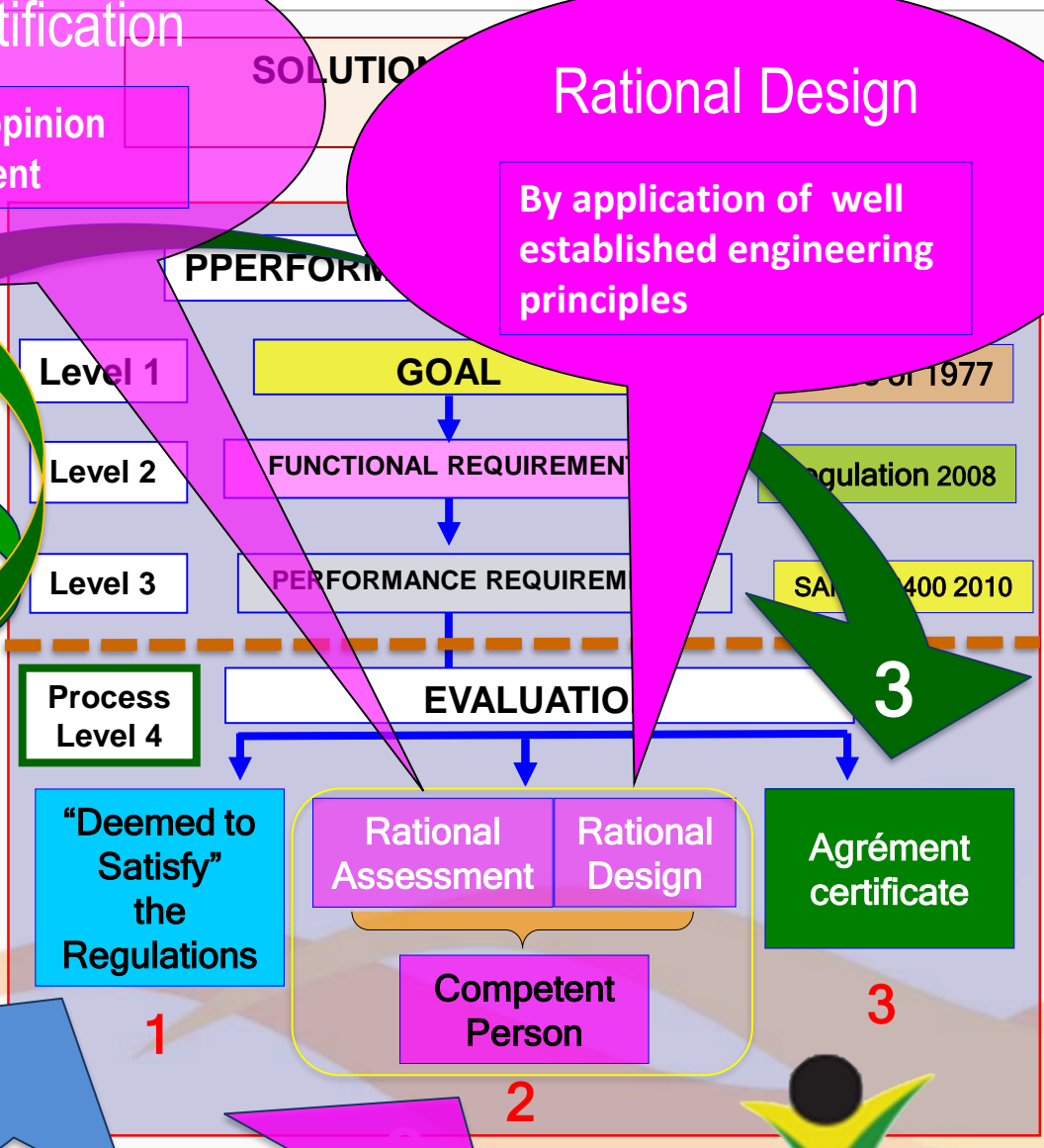
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Peer certification

By expert opinion and judgment

Rational Design

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Complying with the requirements of the National Building Regulations

Regulation AZ 4



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Peer review
By experience and judgment

Regulation A19

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“DEEMED TO SATISFY”

Energy Efficiency in buildings to be achieved by satisfying the requirements of the Regulations by:

Option 1: Minimum requirements set in Standard SANS 10400XA or otherwise described as: “DEEMED TO SATISFY” requirement

Option 2: RATIONAL DESIGN

This alternative requires a “competent person” to design a solution in relation to requirement appropriate testing and service experience involving a process of reasoning and calculation and which may include a design based on a standard or other suitable document;

Option 3: AGRÉMENT: “Fit for purpose” Certification

This alternative allows for the comparison of the building / element design performance with that of “Fit for Purpose” criteria thru testing by Agrément SA.





“RATIONAL DESIGN”

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“FIT FOR PURPOSE”





Bangladesh Garment Factory Building Collapse

24 April 2013 unauthorised building in Shil-Phata area



June 2015
Bangladesh: Owner of the
Garment factory RANA
PLAZA;
Sohel Rana to face murder
charges over 2013 building
collapse that killed 1129
people.

Bangladesh Garment Factory Building Collapse Toll Reaches 1129

April 24 2013

The fugitive owner of an illegally constructed building that collapsed and killed at least 1129 and injured even more, was captured by commandos as he tried to flee into India. District chief officials reported 96 people were hospitalized with serious injuries. Officials said the storey complex had been built on a by ground without the correct permits. The owner reportedly constructed it without permission from relevant authorities and assured the owners of the factories that there was no problem. Officials involved were ; suspended Municipal Commissioner Debaraj Chandra and Assistant Municipal Commissioner Shayam Thorbole who were among 22 persons arrested for the collapse of the unauthorised building in Shil-Phata area

Experts attributed the incidents of building collapse in the country to the lack of proper coordination and inspection by the government bodies.

Tongaat Shopping Centre Collapse

263 Gopalall Hurbans Rd Tongaat, KZN

eThekwini tried to stop building of Tongaat mall

2013-11-19 22:06

Johannesburg - Construction at a shopping mall in Tongaat, north of Duran, where a roof collapsed on Tuesday killing at least one person, should not have been taking place, eThekwini deputy mayor Nomvuzo Shabalala said.

"We took them [the contractors] to court a month ago. We thought they had stopped," she told reporters on the scene.

The reason the municipality took the contractors to court was because "they hadn't followed processes". *"Following an earlier consolidation and rezoning application in terms of the EThekwini Town Planning ordinance (some years back) of what was a number of residential properties an earthworks plan was submitted to the Building Control Department. Such earthworks application was duly refused on four occasions the first refusal being in March 2013.*

At a later date an application for the shopping centre was submitted to LUMs (Land Use Management Department) seeking planning clearance. This clearance was not obtained as items that required resolution by the applicant prevented planning clearance from being granted.

The LUMS approval and clearance is a prerequisite to the submission of a building application, no such building application has or was ever submitted. (Contravention of section 4 of the NBRBS Act 103 of 1977)

At the point where the Building Inspectorate noted piling taking place on the site, a notice was served on the owner; instructing the unauthorised work to cease forthwith.

Failure to comply with the duly issued notices resulted in two separate summonses being served. The matter was escalated to the High Court seeking an interdict compelling the building work to cease. An interim order was granted in the high court in September the final interdict on 14 November 2013. We were in the process of seeking a contempt order when the collapse occurred."

Netcare 911 spokesperson Chris Botha said a concrete slab the size of a soccer field collapsed at the mall.



Orlando Power Station Collapse

Power Park, SOWETO

Orlando Power Station - Building collapsed due to ongoing looting of the structural steel by scrap metal scavengers.

The original building was protected in terms of the National heritage Resources Act No 25 of 1999. 3.

DEMOLITION BY NEGLIGENCE

The Orlando Power Station building has suffered rampant thefts of structural steel over time and it ultimately lost its structural integrity and collapsed in the early hours of the morning on Wednesday, 25 June 2014.

The Orlando Power Station was decommissioned in 1998 and the City of Joburg Property Company SOC Ltd (JPC) has been trying to facilitate its redevelopment as part of a larger development project over the past 10 years. The building was handed over to SPSM in January 2012.

In order to mitigate the rampant theft of the structural steel the developer has had the site fenced off 4 times but the fencing has consistently been stolen, including electrified fencing. The developer has made all reasonable efforts to secure the site and to prevent illegal access to the site.

Orlando Power Station Collapse

Power Park, SOWETO



Meyersdal Eco Estate Structural Failure

Alberton, EKURHULENI

Meyersdal Eco Estate

Meyersdal Eco Estate is one of the most upmarket and exclusive private residential estates for the discerning individual insisting on the highest standards of living, security and safety, while enjoying the splendor of the natural environment.

Forming part of the larger 1080ha Meyersdal Nature Area, the 480ha Meyersdal Eco Estate offers a safe and secure environment on 343 very large stands - ranging from 1600m² to 3600m² - less than 15% of the nature area is developed. Only 10 minutes south of Johannesburg - an environmental paradise with wide open unspoiled nature areas. Meyersdal Eco Estate creates a lifestyle that enhances the relationship between man and nature while preserving and protecting endangered fauna and flora species.



Meyersdal Eco Estate Structural Failure

Alberton, EKURHULENI

Seven people were killed and 11 others injured when the building caved in at the Meyersdal Eco Estate.

At least 26 construction workers were on site when a concrete slab under construction collapsed at a house in the Meyersdal Eco Estate on 18 August 2014.



Is
Liberty
seducing
Justice?



NATIONAL BUILDING REGULATIONS: New Energy Regulations to be introduced soon.....



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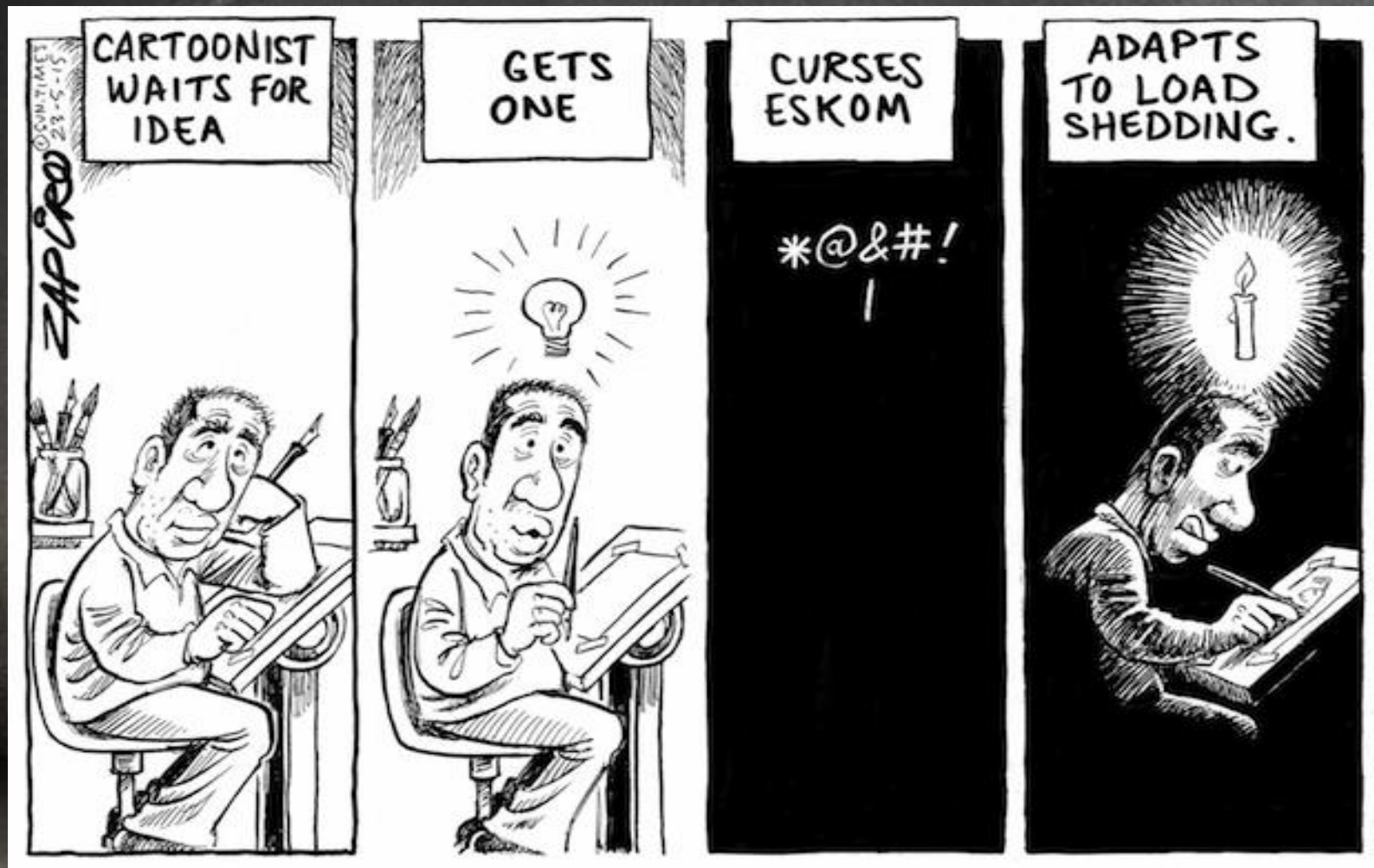
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HOW TO SURVIVE LOAD SHEDDING

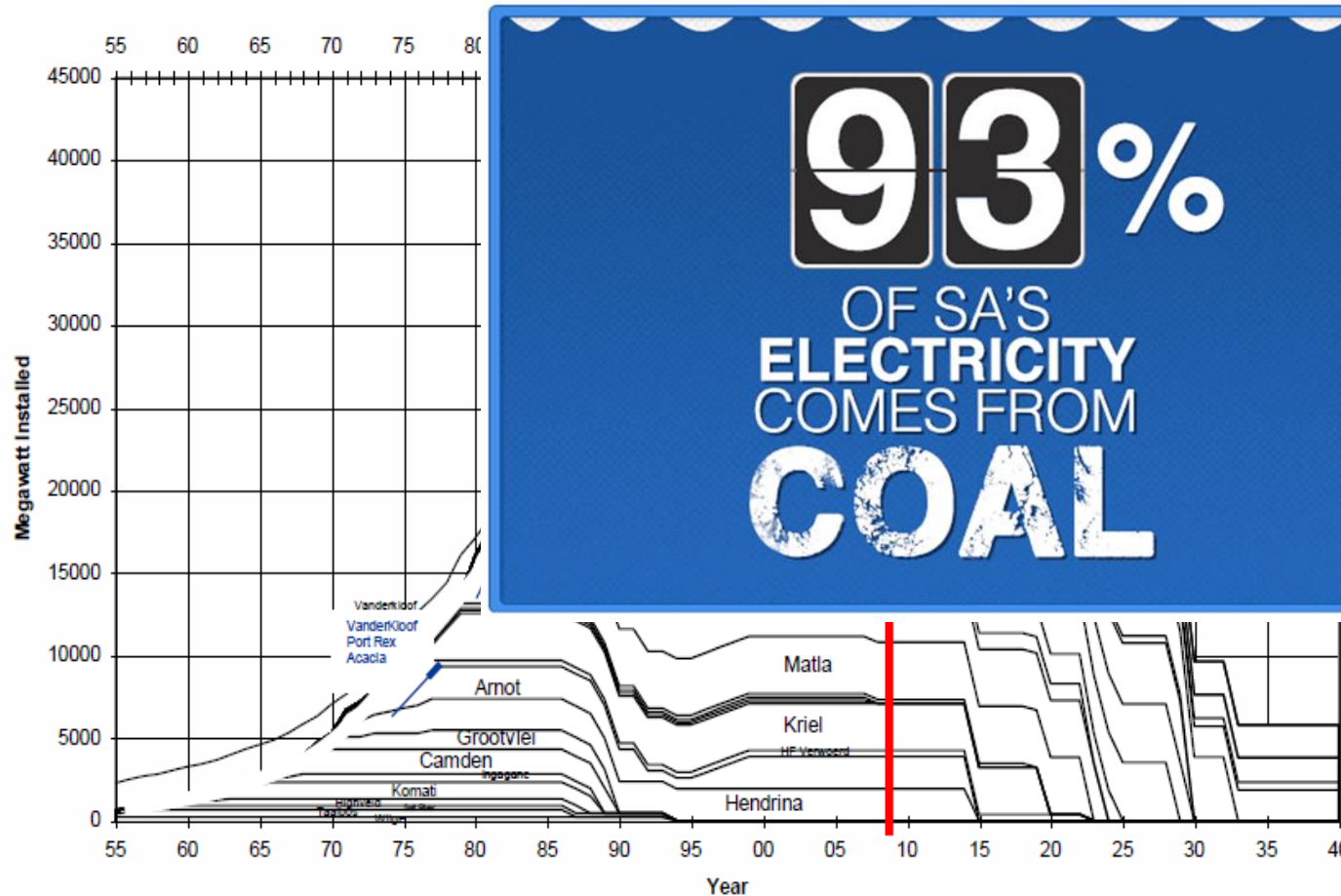


Development of Energy – saving Construction: South Africa



Existing Plant Requires Replacement between 2025 and 2050

Eskom's Installed profile



Most stations at mid life refurbishment point.



the number eleven
enty greenhouse gas
sponsible for 42
emissions, the least
tion in Africa.”
the former SA minister of

Richards Bay
Pietermaritzburg
Durban

ICA

Development of Energy – saving Construction: South Africa



Ex

Energy Efficiency



3

- Why is saving energy important in SA?
- Our energy resources – coal, electricity, gas, and liquid fuels – are not limitless, so it's up to all of us to become energy wise. That means you; your family, your friends and every other South African must start using energy efficiently.

• SANS 204

IEA estimates \$1 spent on energy efficiency save \$2 on generation!
(Source: WEO2006)

Megawatt Installed

	50 W Halogen (230 V)	7 W CFL (230 V)	1 W LED (230 V)
Energy consumed In 4 hours (kJ) (kWh)	720 0.2	101 0.03	14 0.004
Cost (SA cents)	8	1	0.16
Coal required (grams)	65	9	1.3
CO2 produced (grams)	194	27	3.88
Expected life (hours)	2000	8000	25000



Increases on Various Sectors of the South African Economy
isting research

Most



Sorry!

**The lifestyle you
ordered is currently
out of stock**



National Building Regulations Part XA: Energy usage in buildings

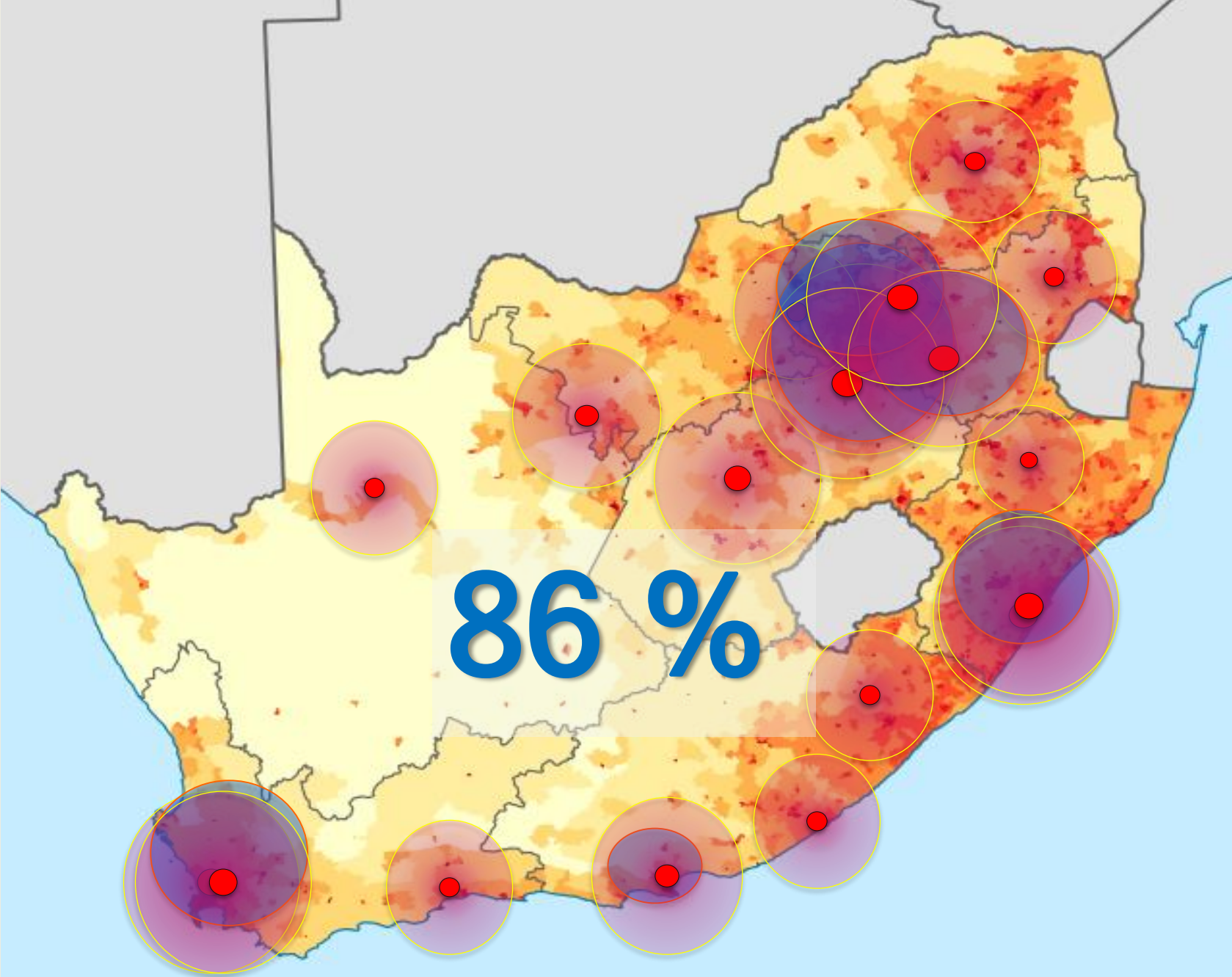
Part X; Sustainable Buildings

- XA1 Buildings shall be designed and constructed so that buildings
- are capable of **using energy efficiently** while fulfilling user needs in relation to **vertical transport**, if any, **thermal comfort, lighting and hot water**; or
 - have **features and services** which **facilitate the efficient use of energy** appropriate to their **function and use, internal environment and geographical location**, and
- XA2 Buildings shall have at least **50 % by volume** of their annual average **hot water heating** requirement **provided by** means **other than electrical resistance heating** including but not limited to **solar heating, heat pumps, heat recovery** from other systems or processes and renewable combustible fuel.
- XA3 The requirements of sub-regulations XA1 shall be deemed to be satisfied when such building is designed and constructed in accordance with the following requirements:
- is the subject of a **rational design by a competent person** which demonstrates that the energy usage of such building is in accordance with SANS 10400-XA, or
 - has an **orientation, shading, services and building envelope in accordance with SANS 10400-XA**; or
 - has a theoretical energy usage performance determined by a **competent person** using **certified thermal calculation software**, less than or equal to that of a reference building in accordance with SANS 10400-XA.

SWISS initiative to empower the Building Industry

South Africa Demographics Profile 2013

urban population: 62% of total population

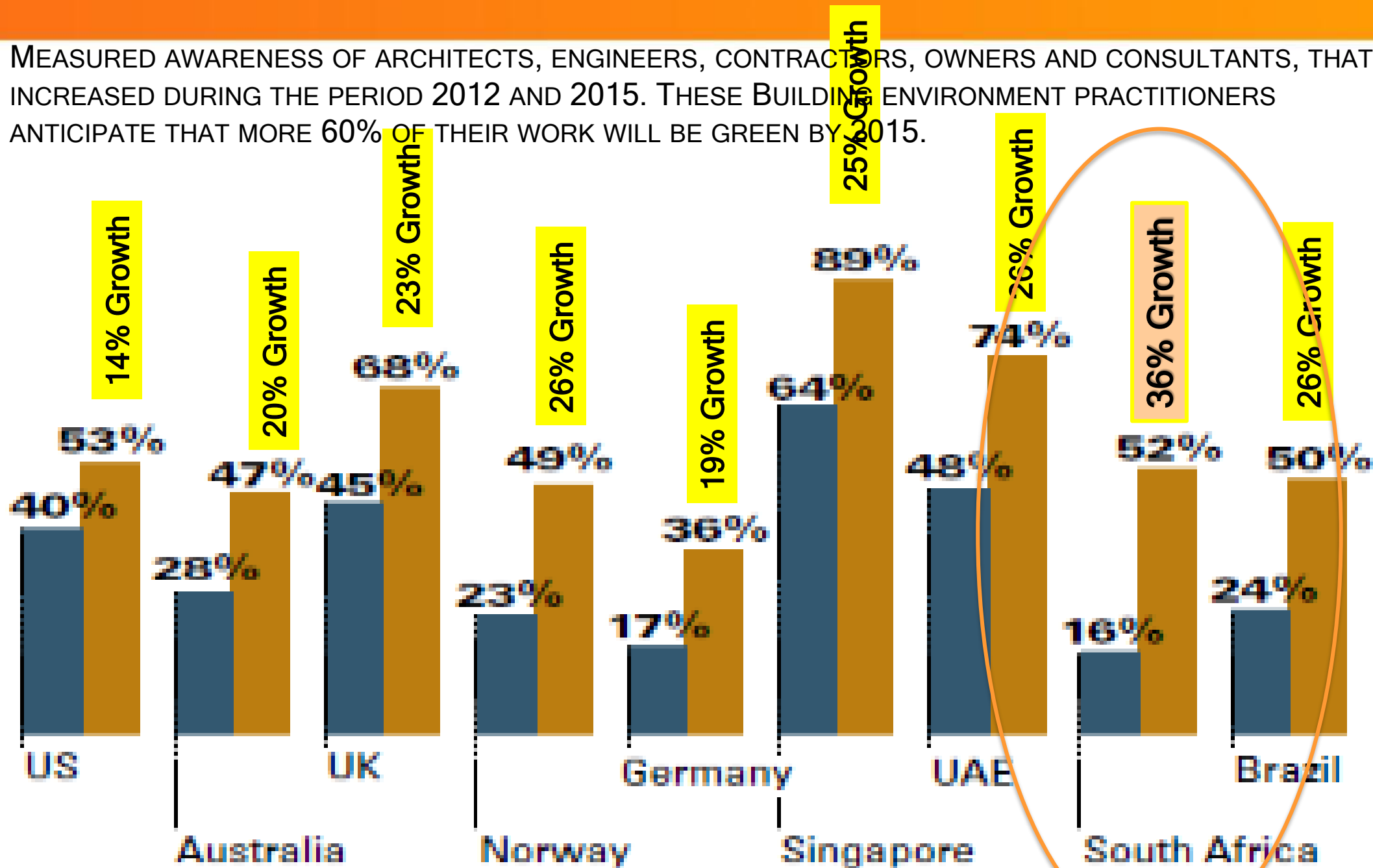


Centers identified as areas for exposure 2013

Recognized main building activities within South Africa

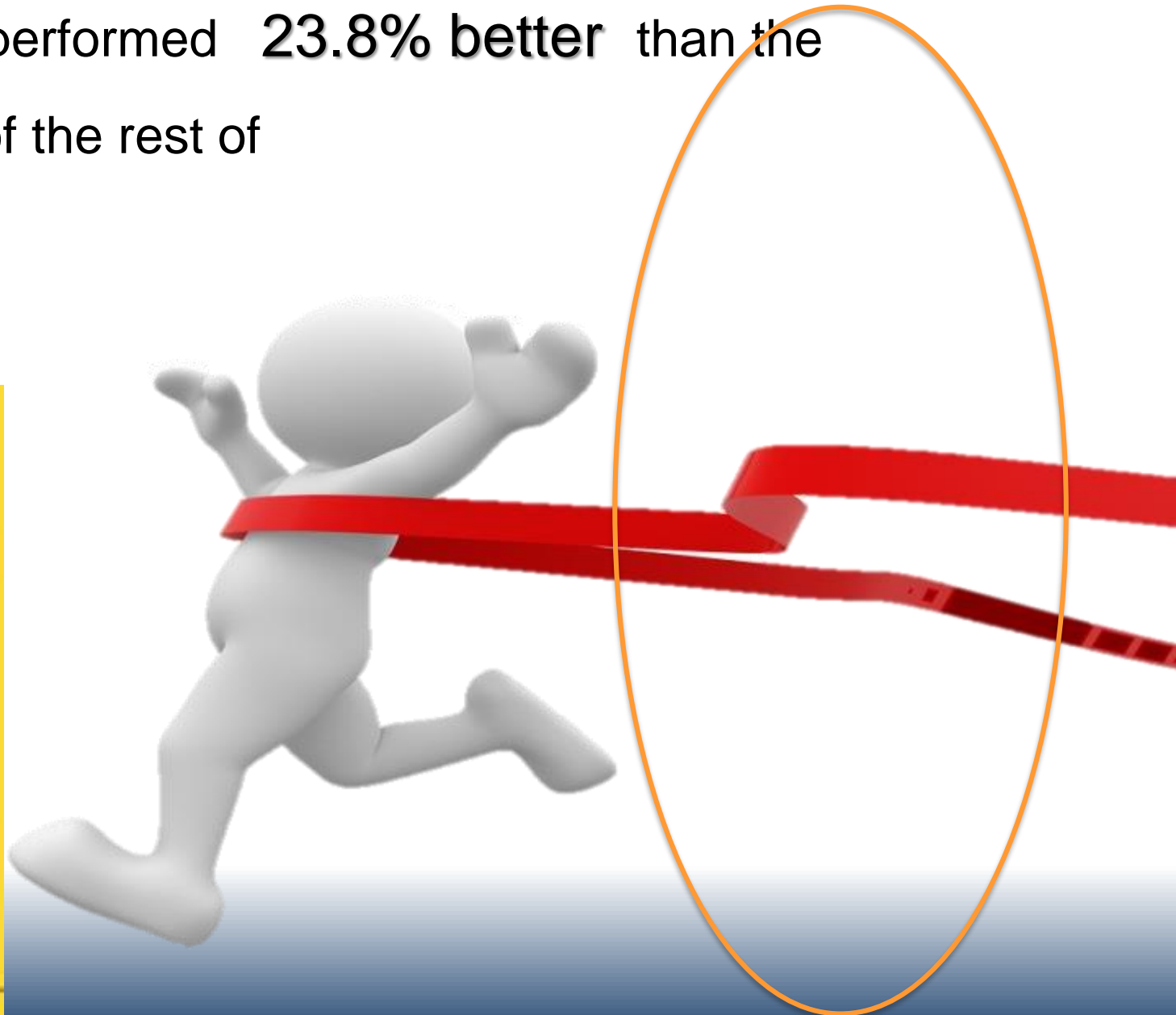
South Africa shows massive increase in Energy efficiency in Buildings

MEASURED AWARENESS OF ARCHITECTS, ENGINEERS, CONTRACTORS, OWNERS AND CONSULTANTS, THAT INCREASED DURING THE PERIOD 2012 AND 2015. THESE BUILDING ENVIRONMENT PRACTITIONERS ANTICIPATE THAT MORE 60% OF THEIR WORK WILL BE GREEN BY 2015.



South Africa shows massive increase in Energy efficiency in Buildings

South Africa therefore performed **23.8% better** than the average performance of the rest of the world, in this period 2012 to 2015.

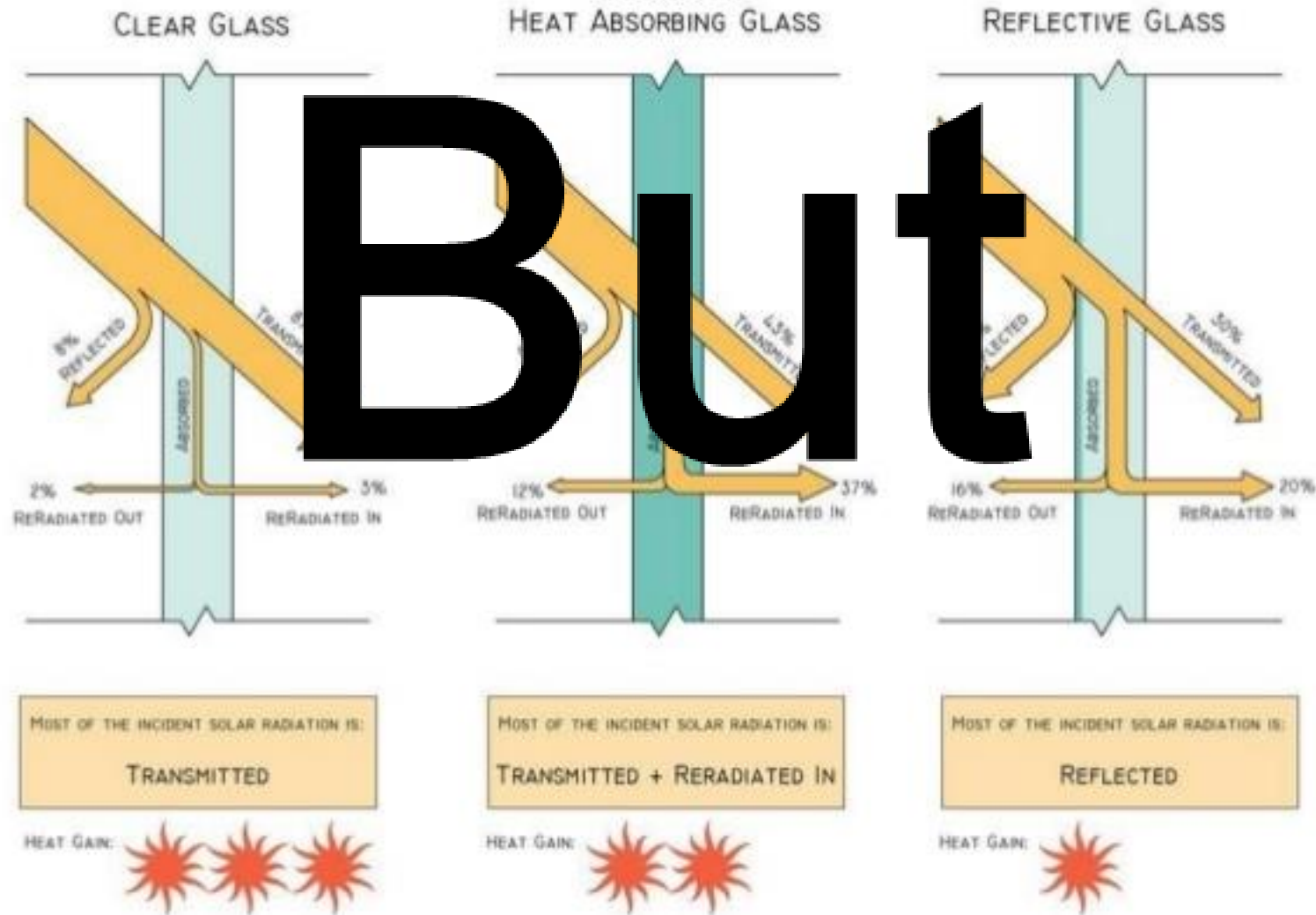




The Energy Efficient implementation in terms of SANS 10400 Part XA has achieved its INCEPTION GOAL.

The impact of introducing the regulation of the energy requirements in buildings - now needs to move to the next level of understanding and implementation.

Solar Transmission through Varying Types of Glass



A thought.....

.....the cheapest unit of
energy is the one
we don't use.



Compulsory for Wires



Energy Efficiency.

All possible measures are to be taken to ensure that the building's use of energy is minimal. Cooling, heating and lighting systems are to use methods and products that conserve or eliminate energy use.

Building Regulation: Part XA; Efficient Energy use in Buildings: 2017

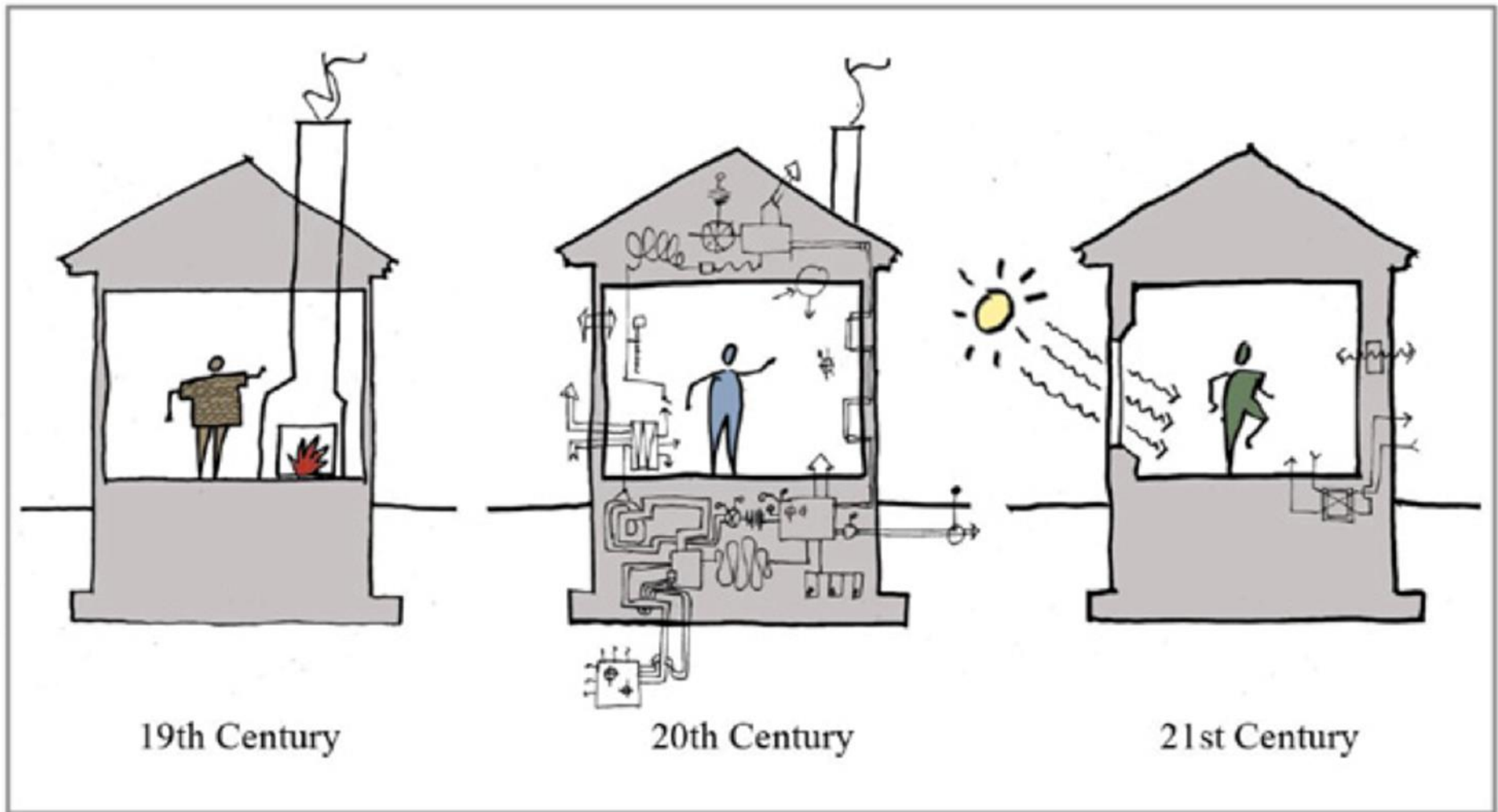


image source: Albert, Righter and Tittmann Architects



SEALED BUILDINGS CANNOT BREATHE

ELEVATORS AND LIGHTS NEED POWER

**MODERN ARCHITECTURE DOES NOT
WORK!**



What is Environmental Design?

“the modern architect has produced the most flagrantly uneconomic and uncomfortable buildings...which can be inhabited only with the aid of the most expensive devices of heating and refrigeration. The irrationality of this system of construction is visible today in every city from New York to San Francisco: glass sheathed buildings without any contact with fresh air, sunlight, or view.” Lewis Mumford.



Radical AWAKENING!

- Grid and energy dependent buildings/environment/systems DID NOT WORK!
- OPERABLE WINDOWS WORKED!
- NATURAL VENTILATION WORKED!
- SHADE WORKED!
- SUNLIGHT WORKED!
- DAYLIT SPACES WORKED!

Radical AWAKENING!

Radical IS Passive...

PASSIVE DESIGN is where the building
uses the SUN, WIND and LIGHT to heat,
cool and light

ARCHITECTURALLY



What is Passive Design?

- is based upon climate considerations
- attempts to control comfort (heating and cooling) without consuming fuels
- uses the orientation of the building to control heat gain and heat loss
- uses the shape of the building (plan, section) to control air flow
- uses materials to control heat
- maximizes use of free solar energy for heating and lighting
- maximizes use of free ventilation for cooling
- uses shade (natural or architectural) to control heat gain

RADICAL STEPS!

#1 - *start* by UNPLUGGING the building

Then...

#2 – heat only with the sun

#3 – cool only with the wind and shade

#4 – light only with daylight

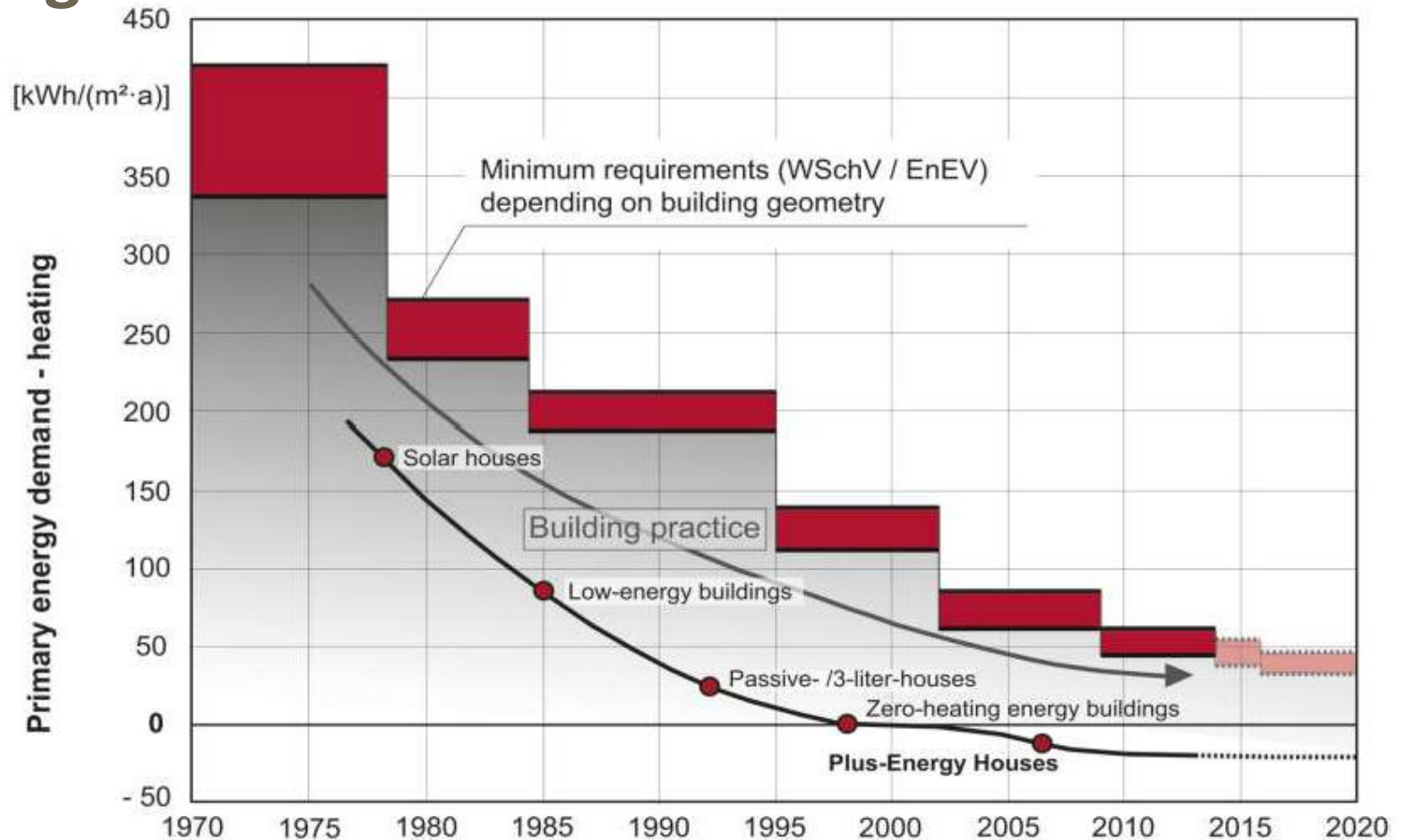
USE the ARCHITECTURE first, and mechanical systems only to supplement what you cannot otherwise provide.

#5 – USE RENEWABLE CLEAN ENERGY BEFORE HOOKING UP TO NATURAL GAS, OIL OR THE REGULAR ELECTRICAL GRID (with all of its nastiness – including CO₂)

National Development Plan

*“Progressively strengthen the energy-efficiency criteria set out in the South African National Standard to **achieve a zero-carbon building standard by 2030**” (page 292).*

Why tightening is so important...



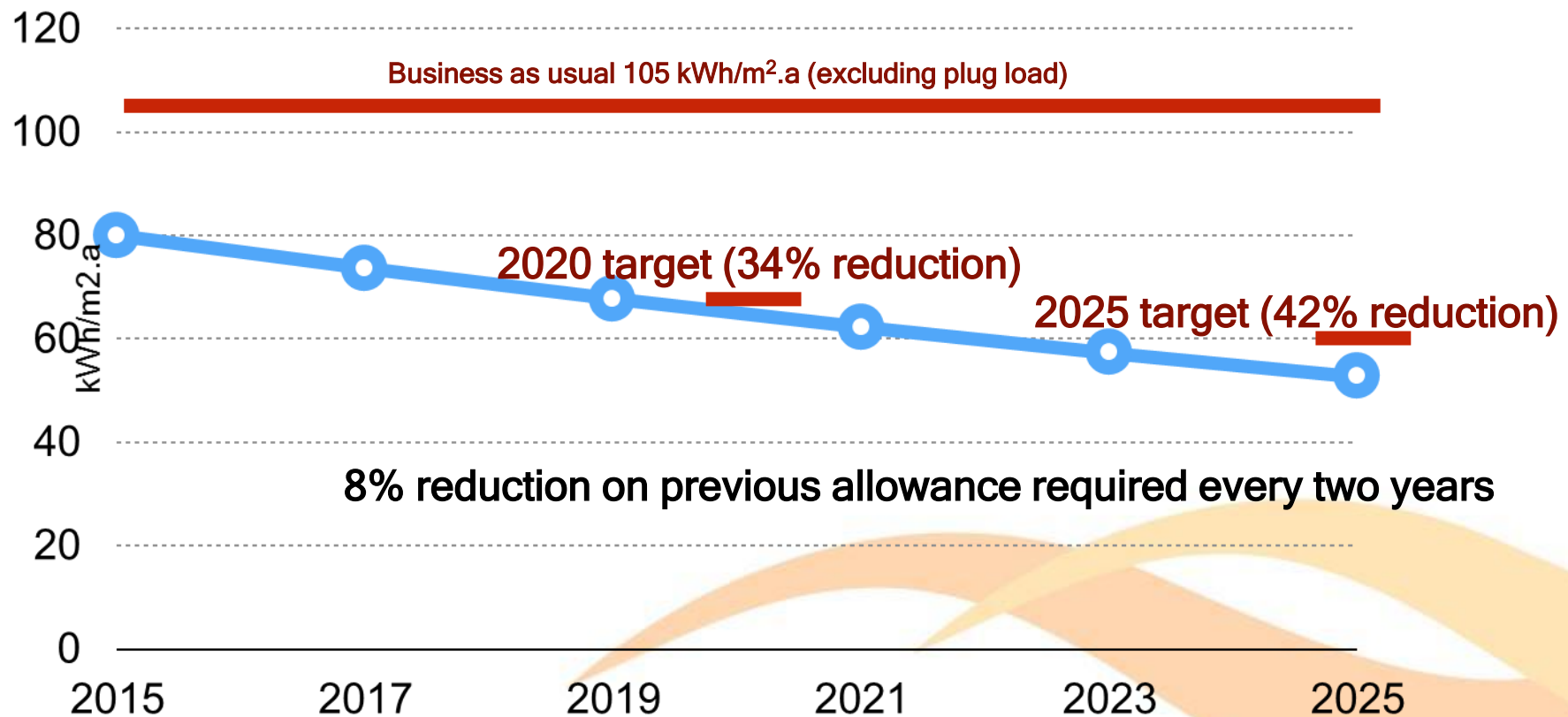
Source: Prof. G. Hauser, TUM, 2013

Building Regulation: Part XA; Efficient Energy use in Buildings: 2017

Why we have to do something in SA until 2030 to comply with our promises at COP 17

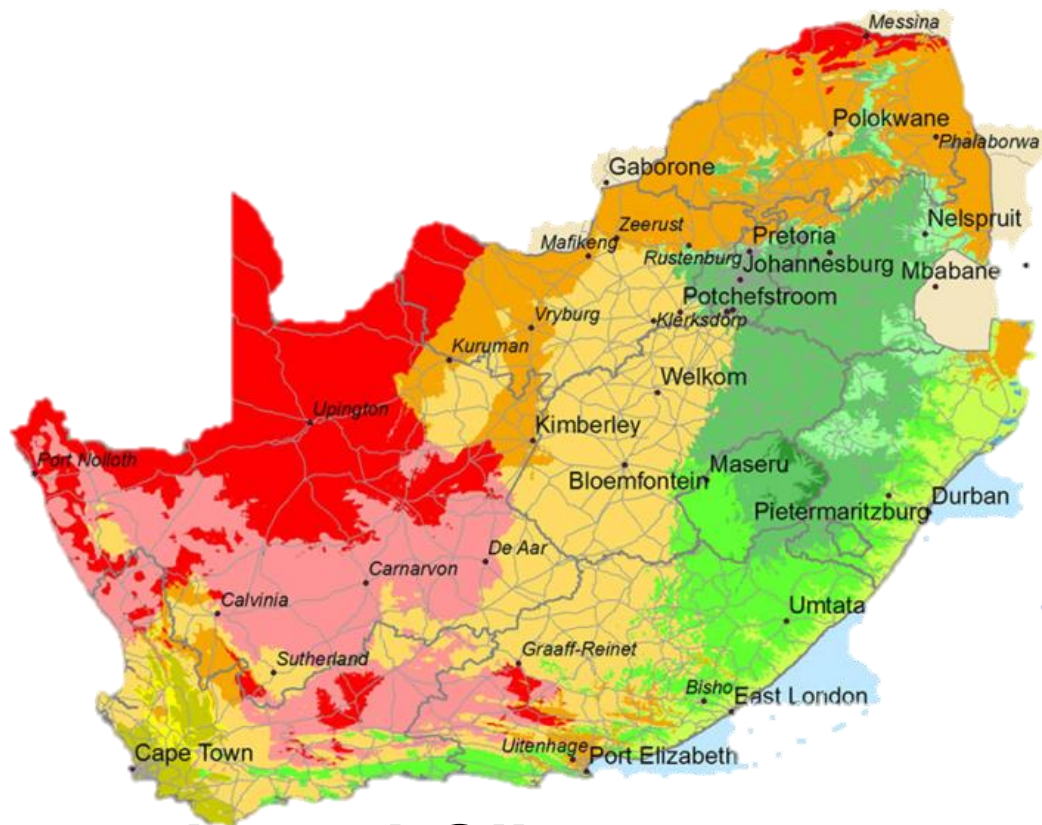
Why tightening is so important...

New proposed figures for offices

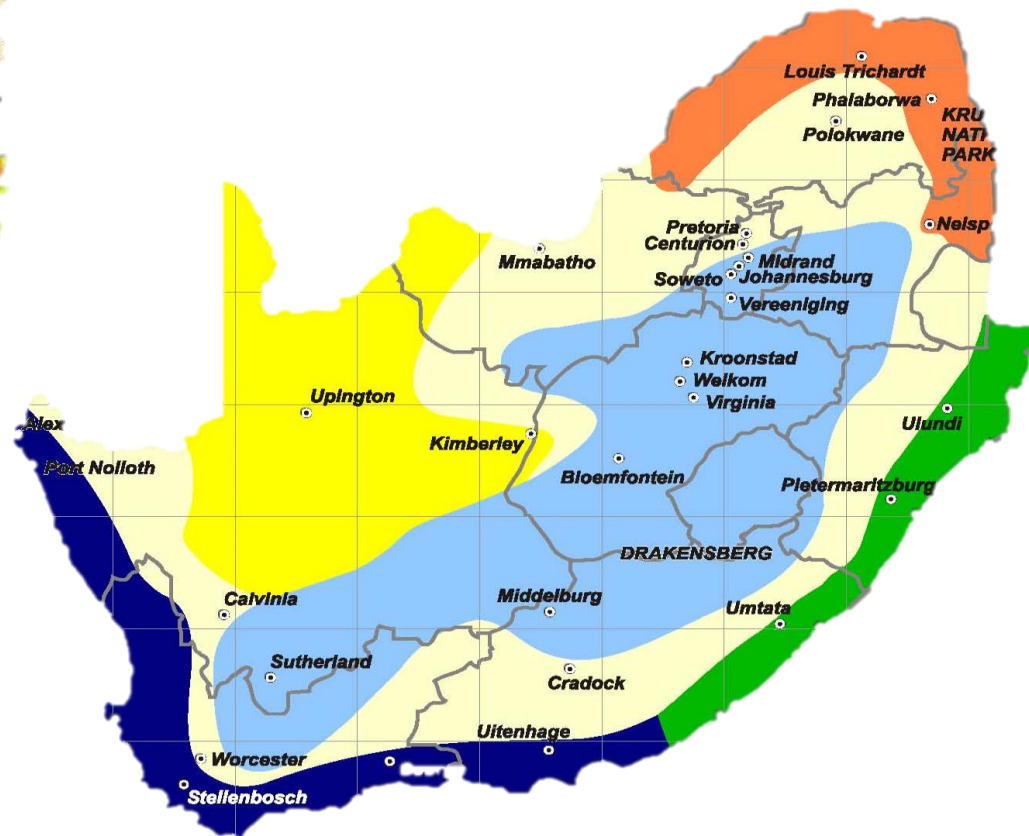


Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017

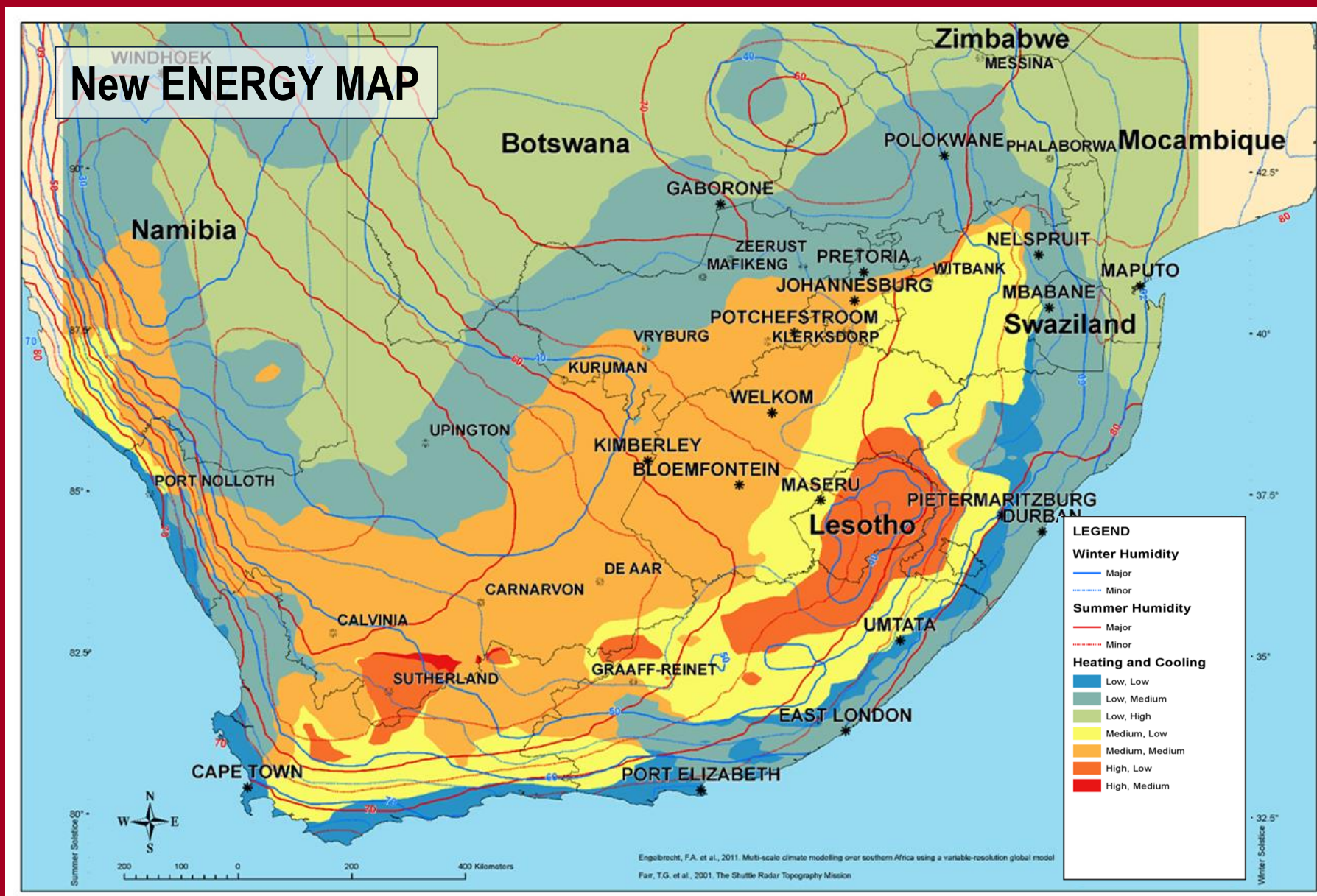
Climate Zones SANS10400: 2011



Actual Climate



Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017



Reproduced here with kind permission of: **Dr Dirk Conradie**

CSIR Built Environment

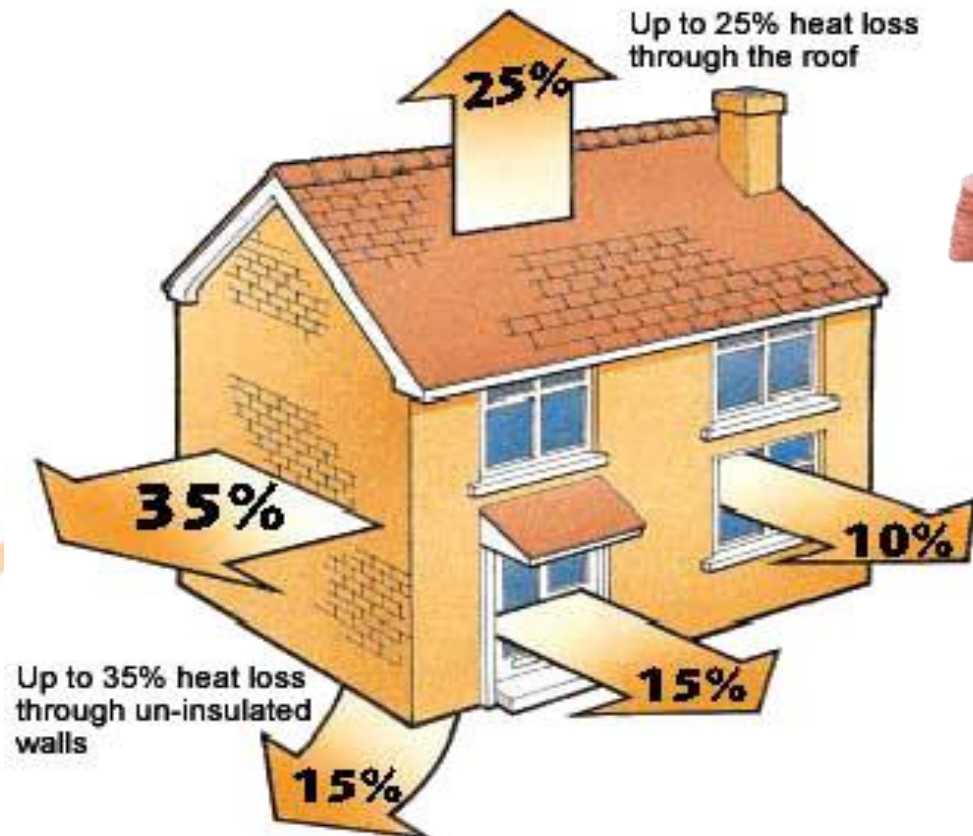
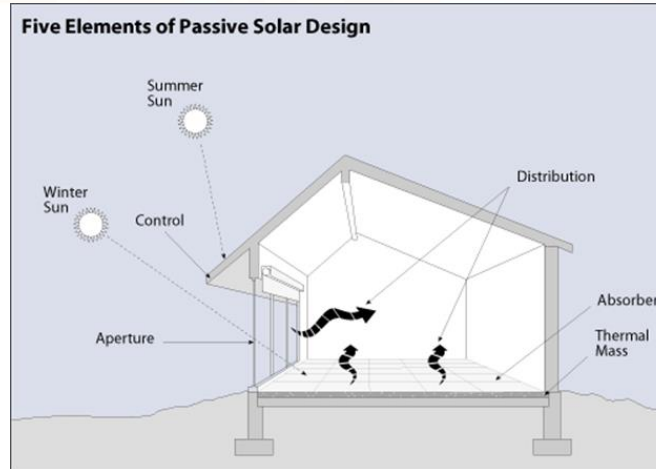
Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”



ENERGY EFFICIENCY IN BUILDINGS is achieved by compliance with solutions provided in SANS 10400 XA or otherwise described as: **“DEEMED TO SATISFY”** requirements.

For:

- Orientation of building;
- Shading of windows and north face;
- Roof and ceiling insulation;
- Wall performance prescribed;
- Floor insulation; where underfloor heating is installed
- Electrical lighting regulated.
- Heating of water. Use of alternatives to electric resistance heating for water such as solar collectors and heat pumps.



Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”



Environmental Sustainable Buildings within the Standards –
SANS 10400 XA Efficient Energy



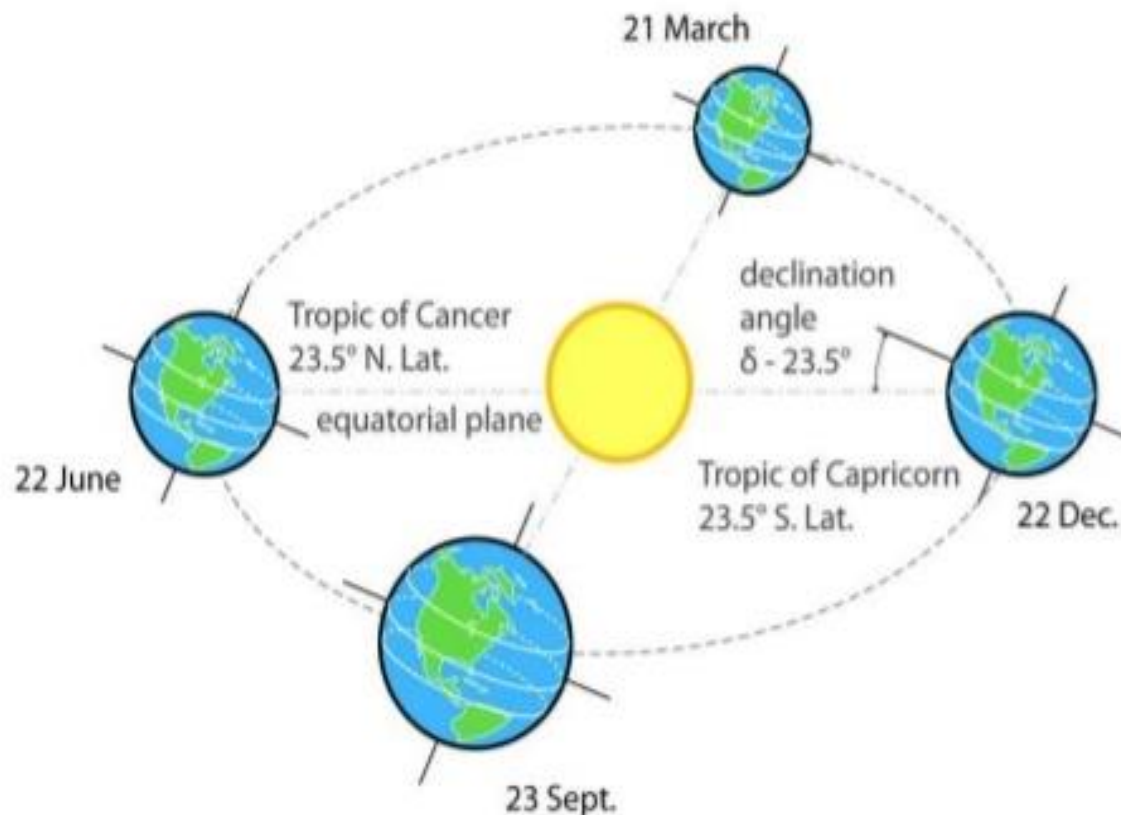
Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”

ENERGY EFFICIENCY IN BUILDINGS is achieved by compliance with solutions provided in SANS 10400 XA or otherwise described as: “DEEMED TO SATISFY”

2

- Orientation of building;

Shading of windows and Northern face of the building



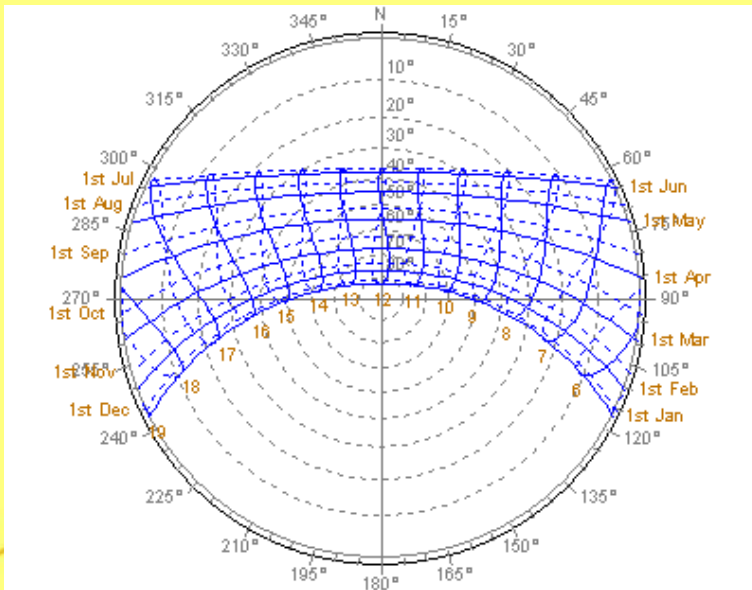
Earth's motion around the sun.

Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”

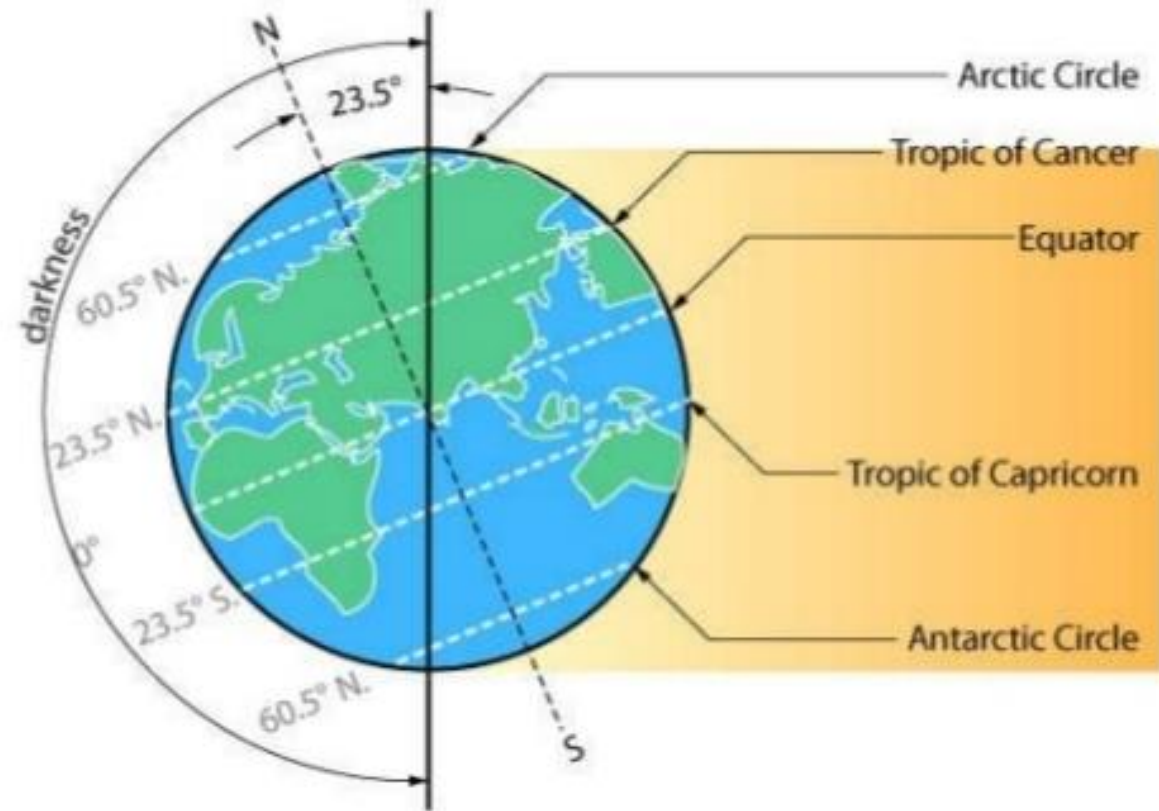
ENERGY EFFICIENCY IN BUILDINGS is achieved by compliance with solutions provided in SANS 10400 XA or otherwise described as: “DEEMED TO SATISFY”

2

- Orientation of building;
Shading of windows and Northern face of the building



Solar Position

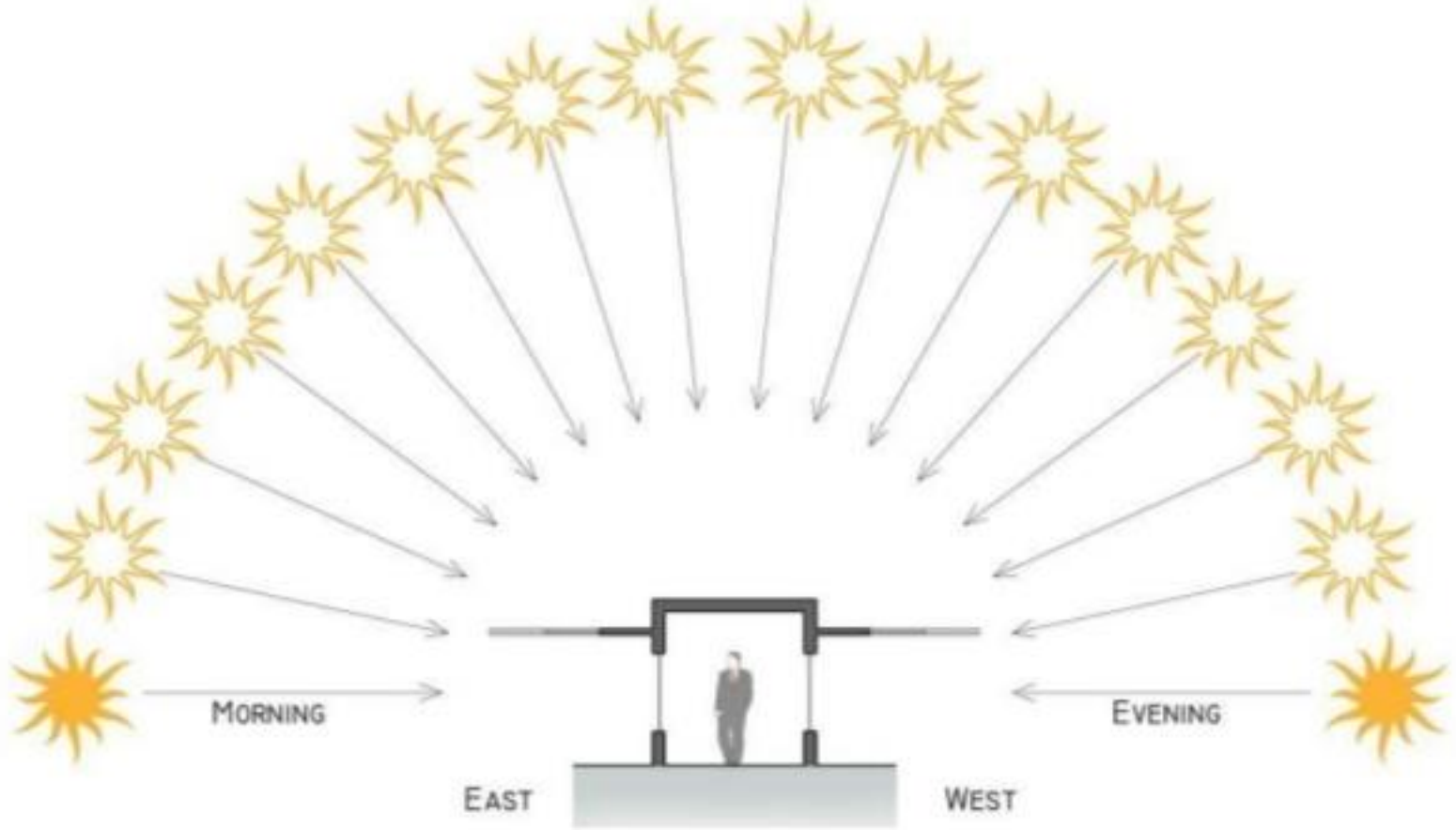


Earth relative to sun at winter solstice.

Earth's motion around the sun.

Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017

Shading Strategies for East and West Orientations



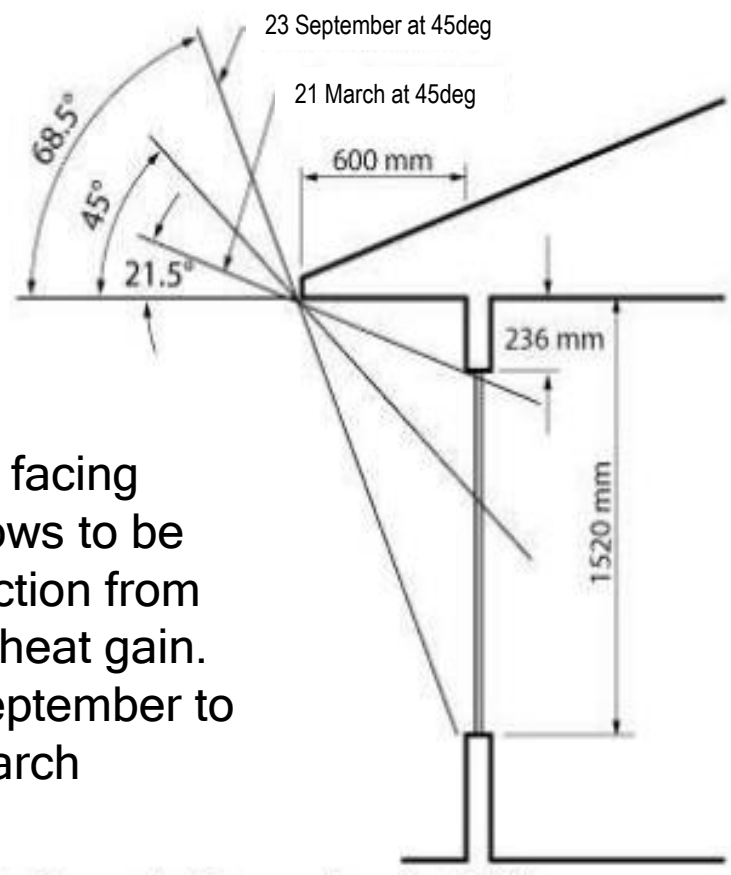
HORIZONTAL OVERHANGS DO NOT WORK ON EAST & WEST FACADES

Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017

Shading

The Geometry of Shading Devices

tions



North facing windows to be protection from solar heat gain. 23 September to 21 March

Shading Angles for North Facing wall at 45deg

Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017

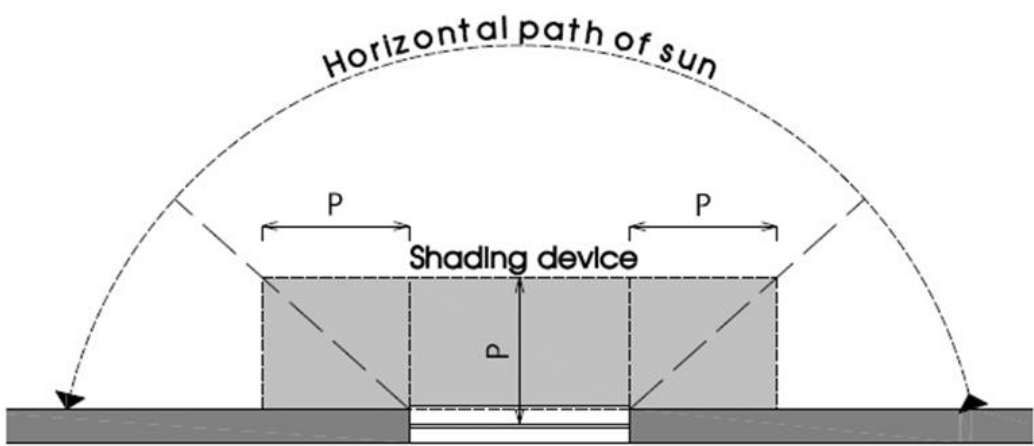
Key

P horizontal distance, expressed in meters, from the glass face to the shadow casting edge of any shading projection

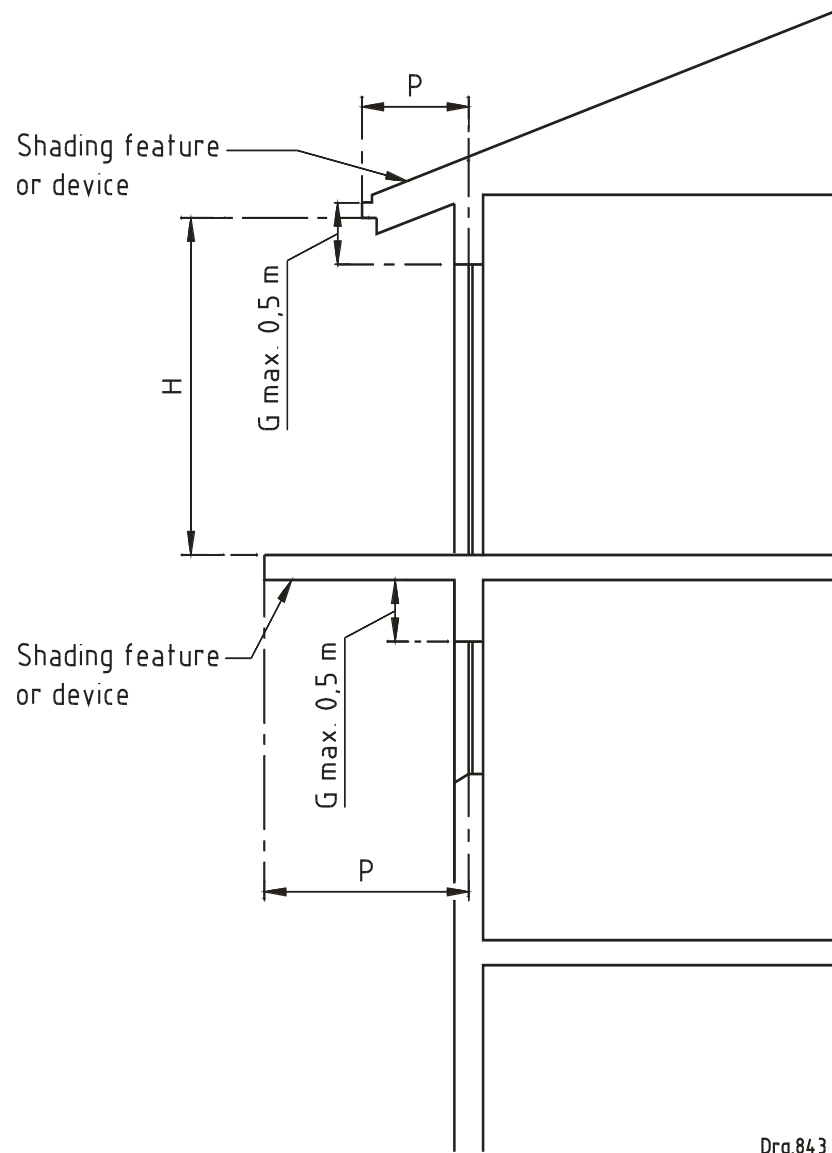
H vertical distance from the base of the glazing element to the same shadow casting edge used to measure *P*

G vertical distance from the head of the glazing element to the shadow casting edge of any shading projection

NOTE: An adjustable shading device that is capable of completely covering the glazing may be considered to achieve a *P/H* value of 2.



P: Horizontal distance from the glass face to the shadow casting edge of the shading device. (Extends horizontally on both sides of the glazing)



Drg 843

Figure 3 — Complying shading device for North, North East and North West elevations

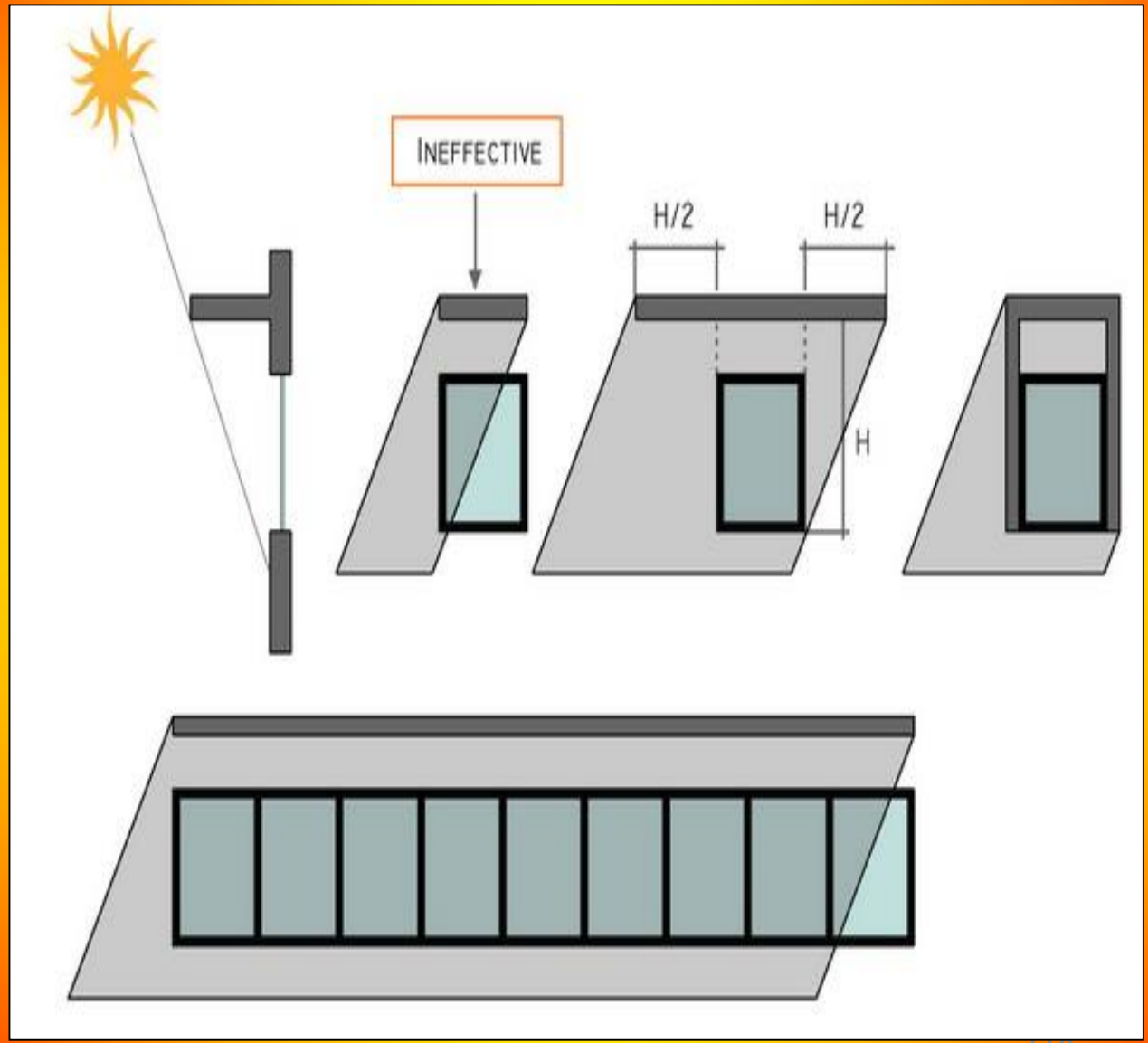
Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017

ENERGY EFFICIENCY IN BUILDINGS is achieved by compliance with solutions provided in SANS 10400 XA or otherwise described as: “DEEMED TO SATISFY”

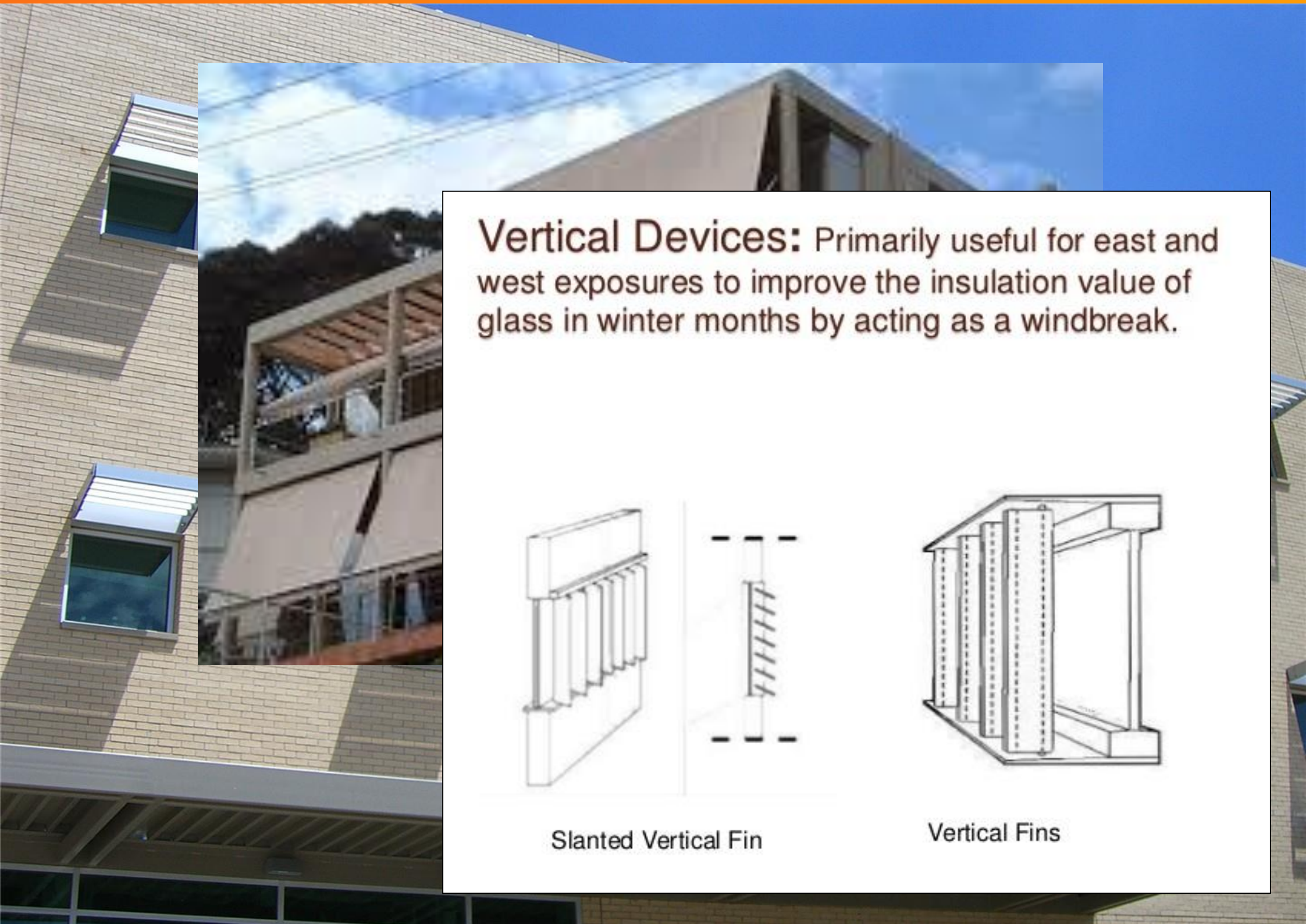
2

- Orientation of building;

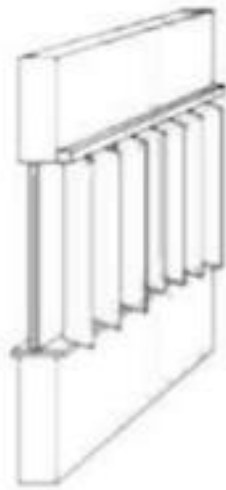
Shading of windows:



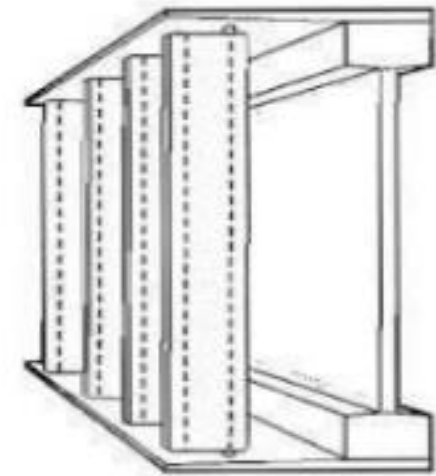




Vertical Devices: Primarily useful for east and west exposures to improve the insulation value of glass in winter months by acting as a windbreak.

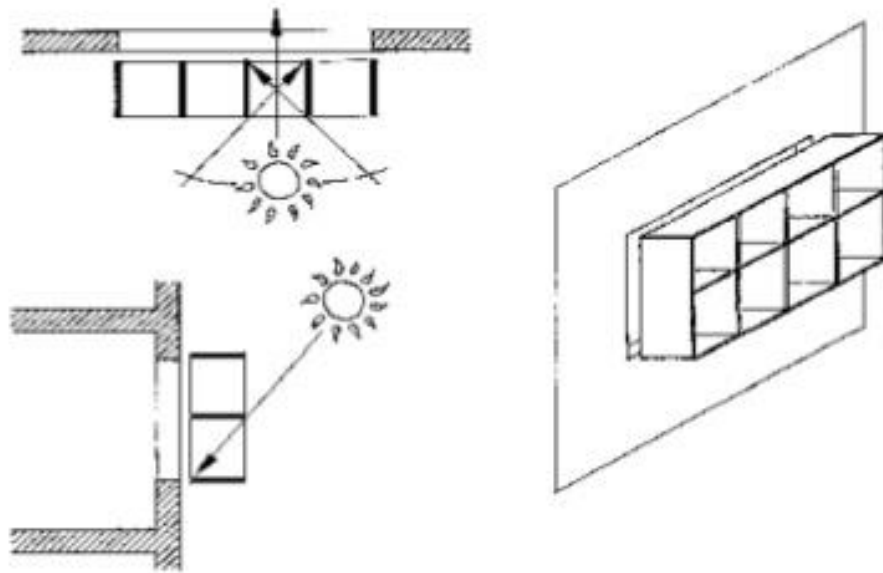


Slanted Vertical Fin

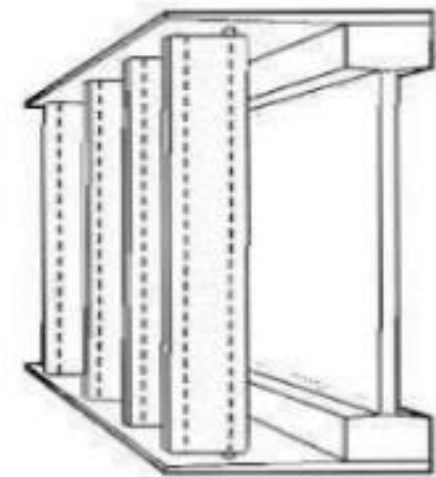


Vertical Fins

The egg-crate: A combination of vertical and horizontal shading elements commonly used in hot climate regions because of their high shading efficiencies. The horizontal elements control ground glare from reflected solar rays. The device works well on walls



Primarily useful for east and west walls to improve the insulation value of the wall by acting as a windbreak.

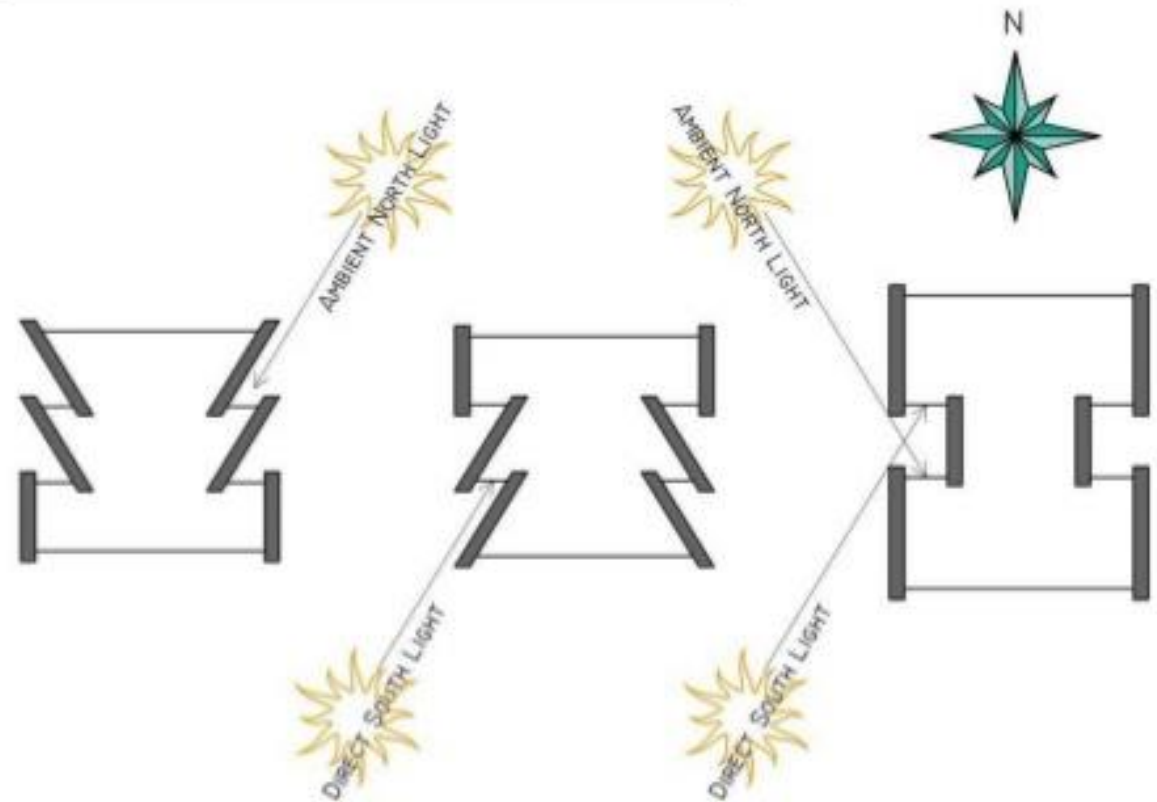


Vertical Fins

Shading Strategies for East and West Elevations

AVOID WINDOWS ON THE EAST & WEST FACADE
BY SHIFTING THE WINDOWS TO FACE NORTH OR SOUTH:

1. The best solution
by far is to limit using
east and especially
west windows (as
much as possible in
hot climates)

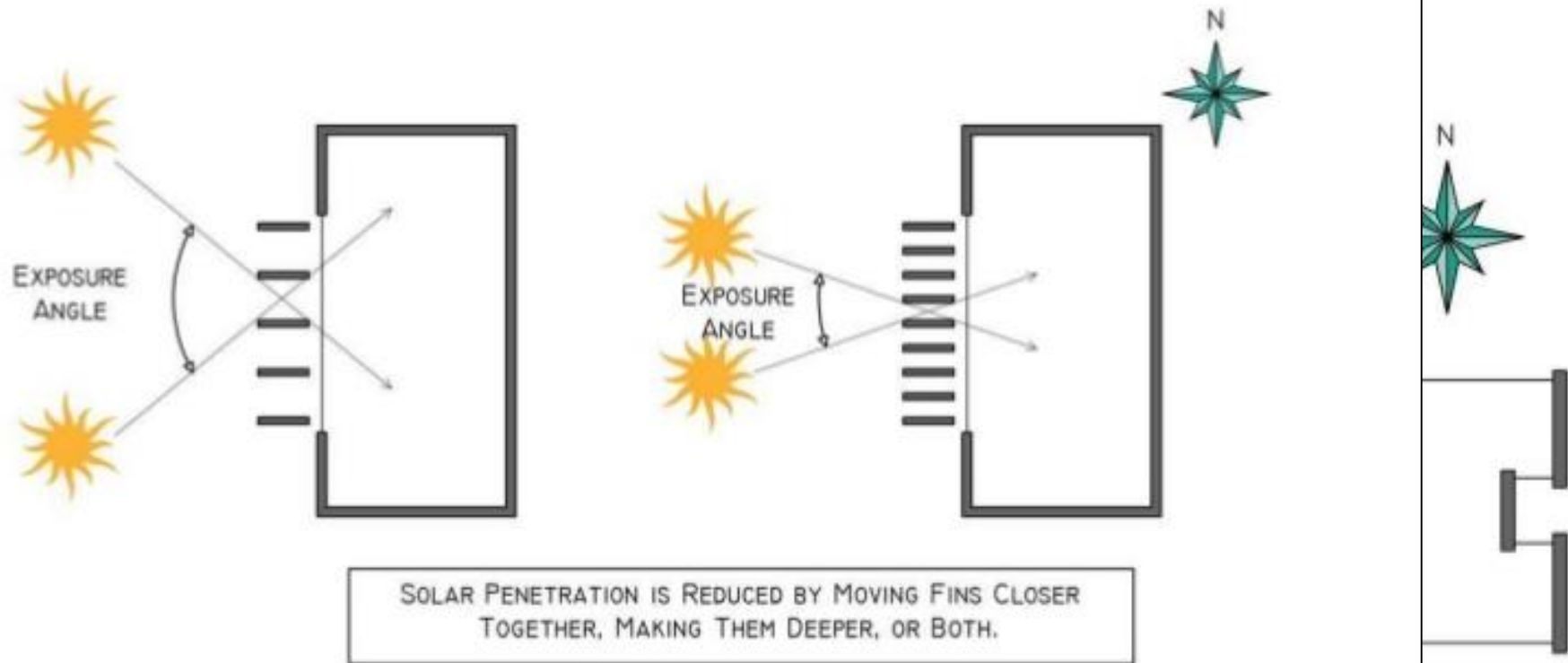


2. Next best solution is to have windows on the east
and west façades face north or south

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Shading Strategies for East and West Elevations



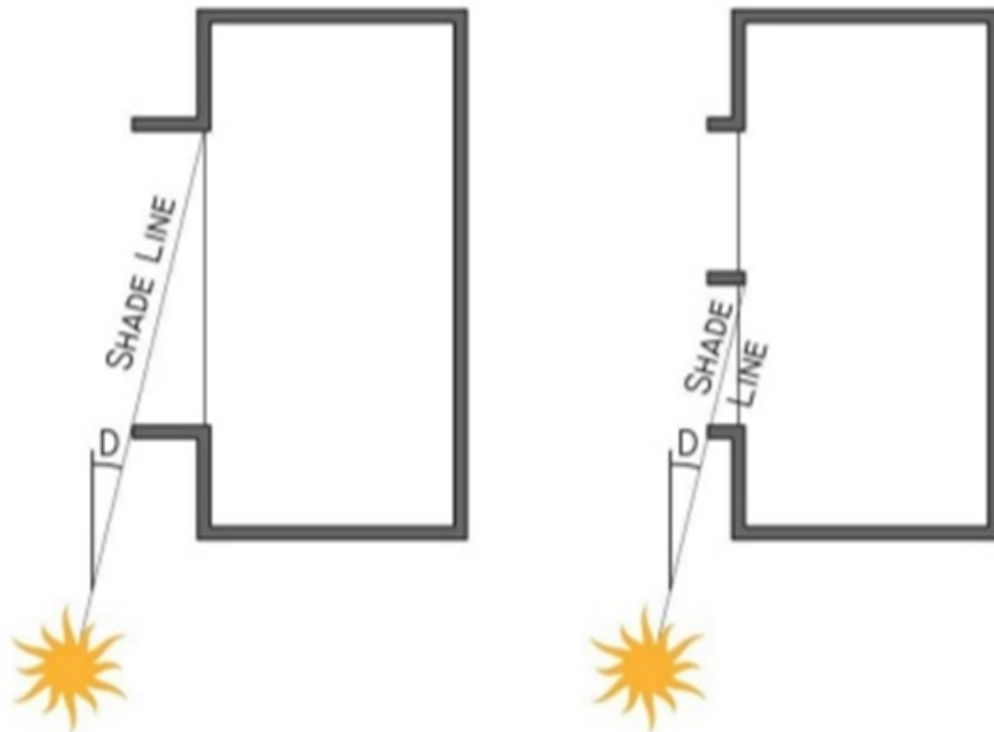
3. Use Vertical Fins. Spacing is an issue, as well as fin length. Must be understood that if to be effective, they will severely restrict the view.

2. Next best solution is to have windows on the east and west façades face north or south

The
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Shading Strategies for the South Elevation

Vertical Fin Strategy on South Façade:

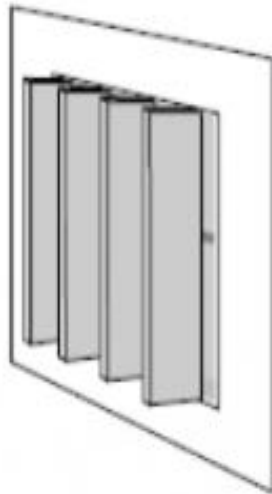


The sun also hits the façade from the south east and south west during the summer. Fins can be used to control this oblique light as well. It is an function of the latitude, window size and fin depth/frequency.

THE "SHADE LINE" AT ANGLE "D" DETERMINES FIN SPACING & DEPTH.

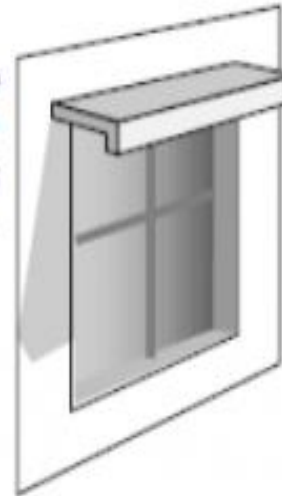
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Standard horizontal overhang.



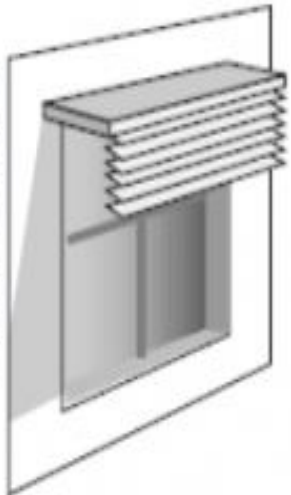
Vertical louvers or fins for east and especially west facades.

Drop the edge for less projection.

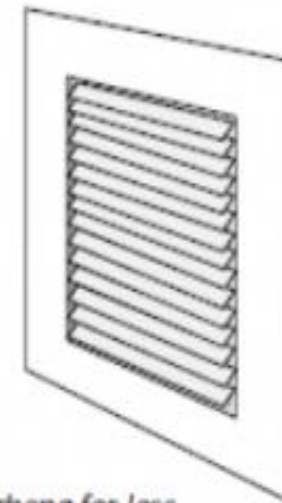
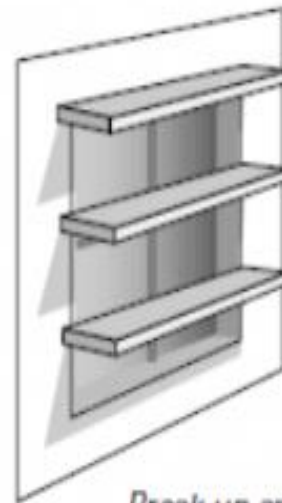


Slope it down for less projection.

Substitute louvers for the solid dropped edge to let in more light.



Use louvers in place of solid overhang for more diffuse light while still shading.



Break up an overhang for less projection.

THE "SHADE LINE" AT ANGLE "D" DETERMINES FIN SPACING & DEPTH.

Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017

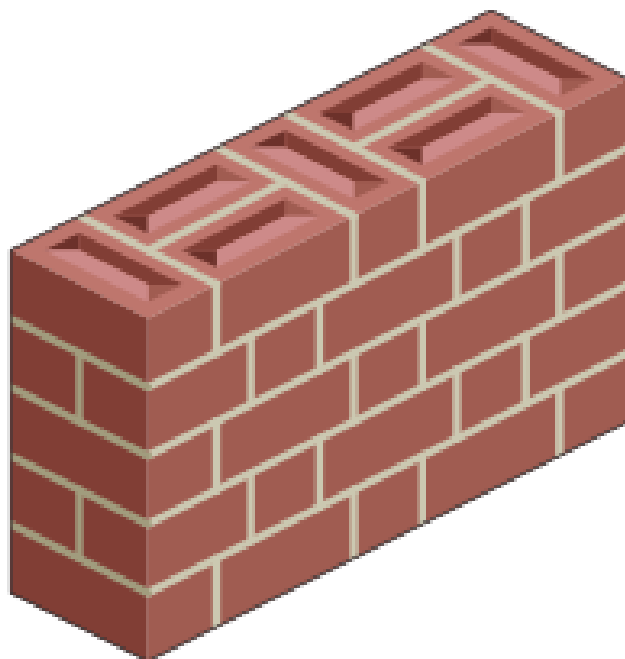


ENERGY EFFICIENCY is achieved by compliance with the solutions provided in SANS 10400-XA or otherwise designed to satisfy the “DEEMED TO SATISFY” requirements.

For:

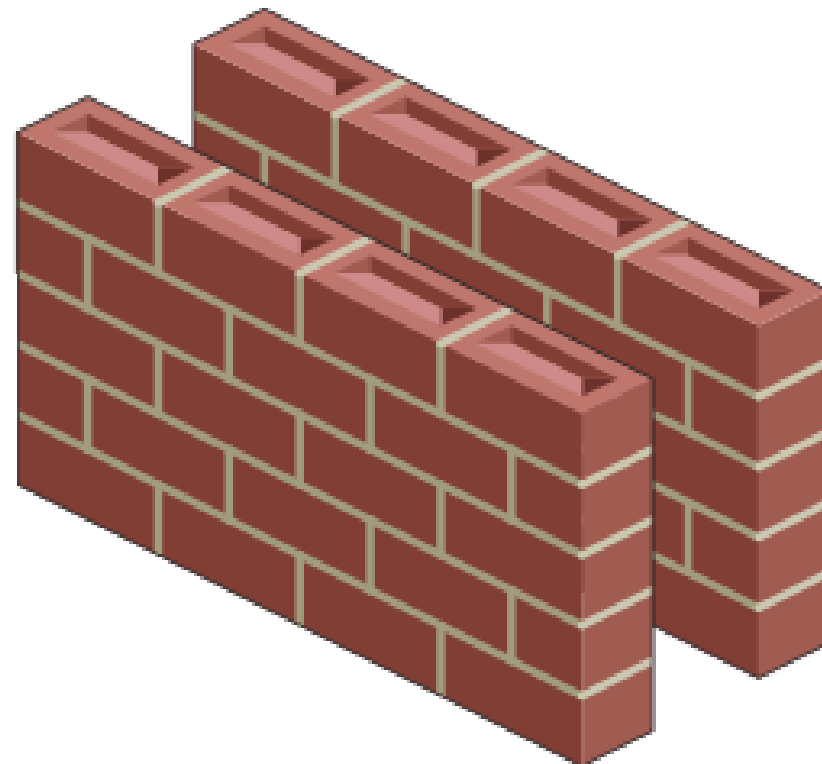
- Orientation of building
- Shading of window face;
- Roof and ceiling

Wall performance



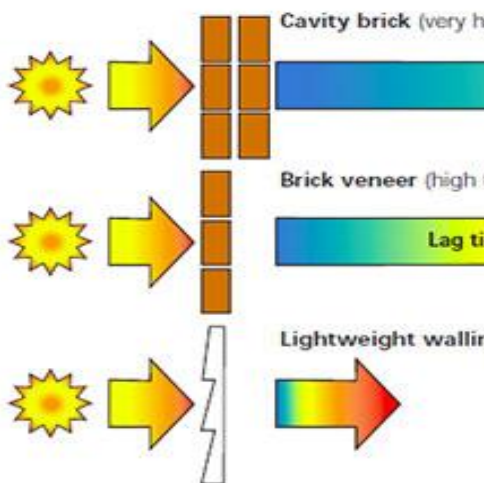
Solid Wall Construction

Usually consists of two 115 bricks laid side to side without a space between the bricks. Making a 230 wide brick wall.

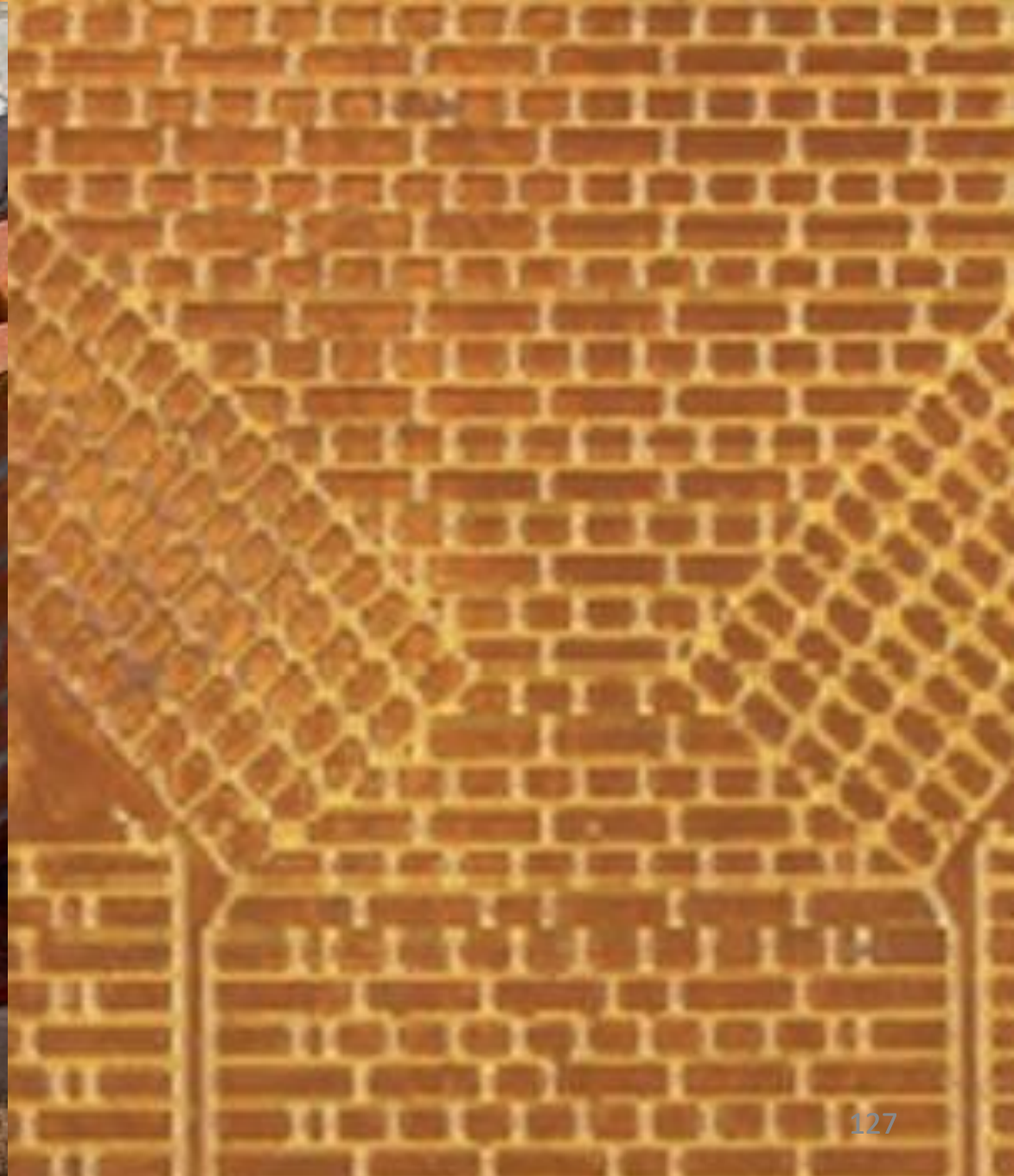


Cavity Wall Construction

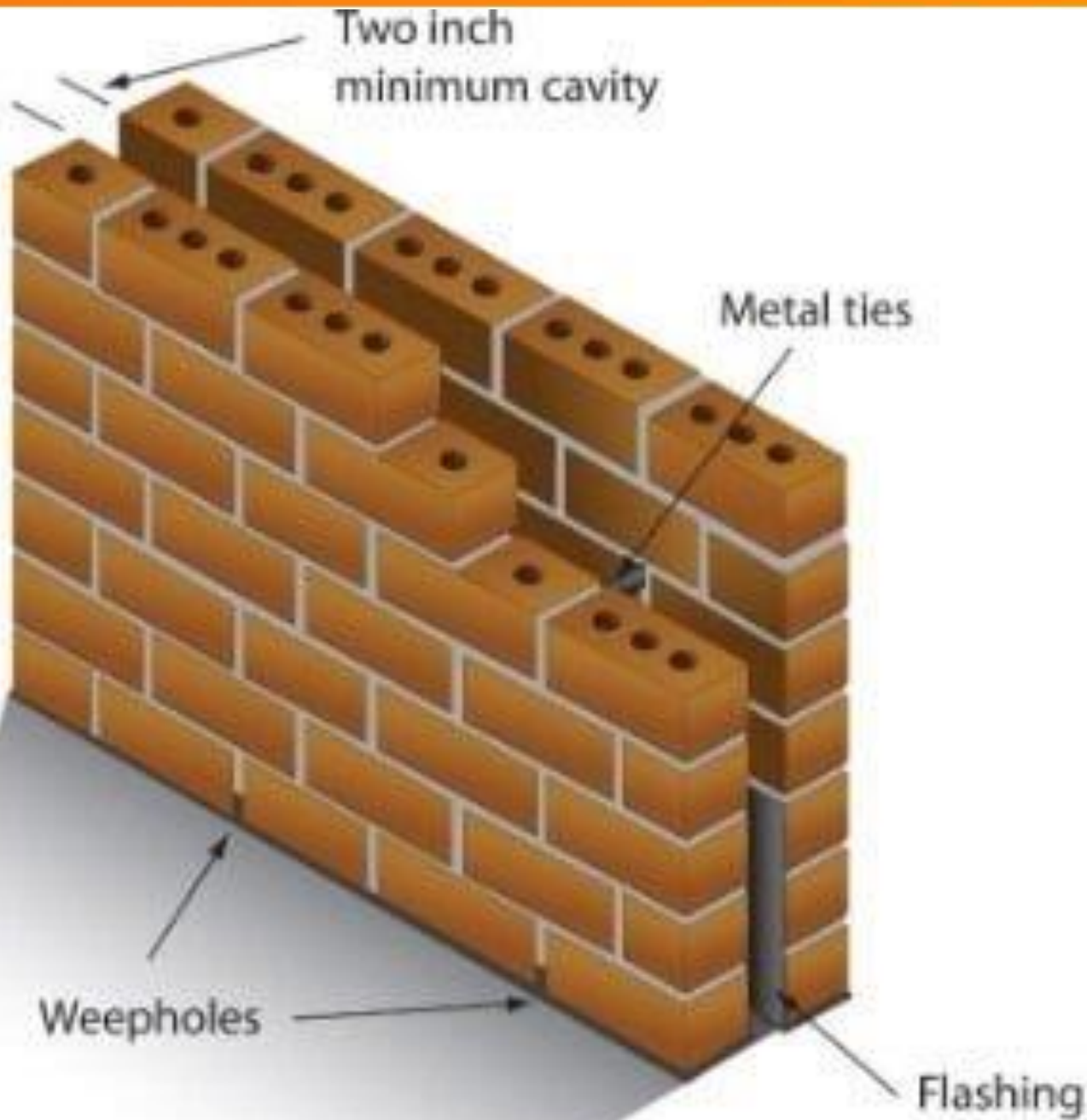
Usually consists of two 115 bricks laid side to side with a 50mm space between the bricks. Making a 280mm wide brick wall.



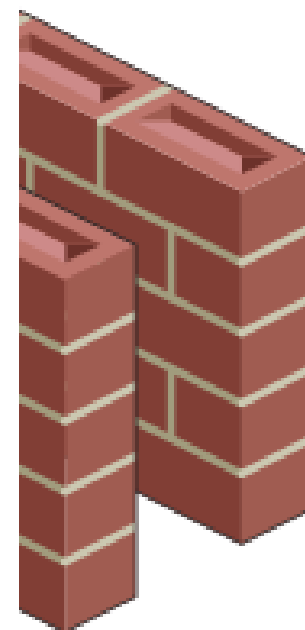
Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy “ rules provided in; SANS 10400-XA: 2017



Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017



on
ricks laid
etween the
ck wall.



Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy “ rules provided in; SANS 10400-XA: 2017



Two inch



Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”

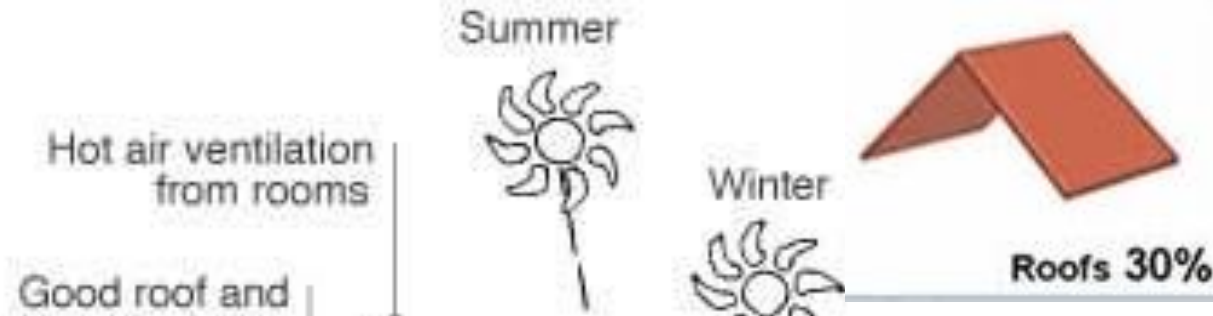
ENERGY EFFICIENCY IN BUILDINGS is achieved by compliance with solutions provided in SANS 10400 XA or otherwise described as: “DEEMED TO SATISFY” requirements.

4

For:

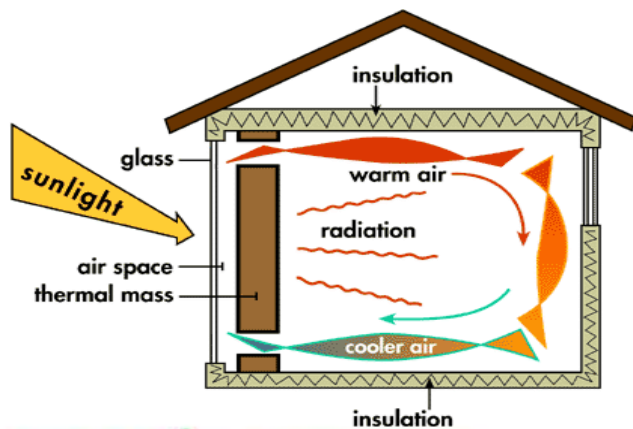
- Orientation of building;
- Shading of windows and north face;

• **Roof and ceiling insulation**

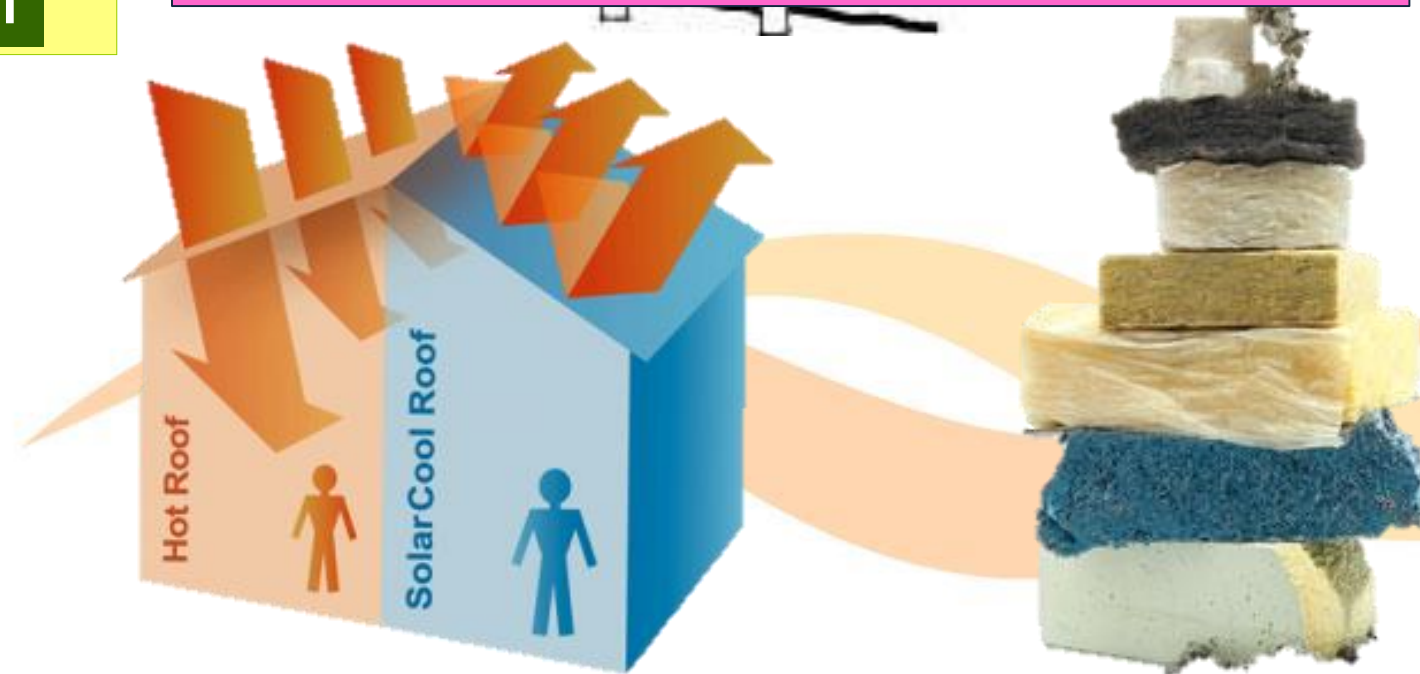


Roof and ceiling insulation is to be regulated

SANS 1381-1 TO BE CLASSIFIED AS A COMPULSORY SPECIFICATION IN SOUTH AFRICA



NRCS national regulator for compulsory specifications



Black vs White Roofs



Contributes to Global Warming
Raises city's outside temperature



Contributes to Global Cooling
Lowers city's outside temperature



Sunlight Reflected
20%

Roof Surface Temperature
180°

Roof Surface Temperature
100°



Sunlight Reflected
85%

Inside Temperature
115°

Inside Temperature
80°



Sources

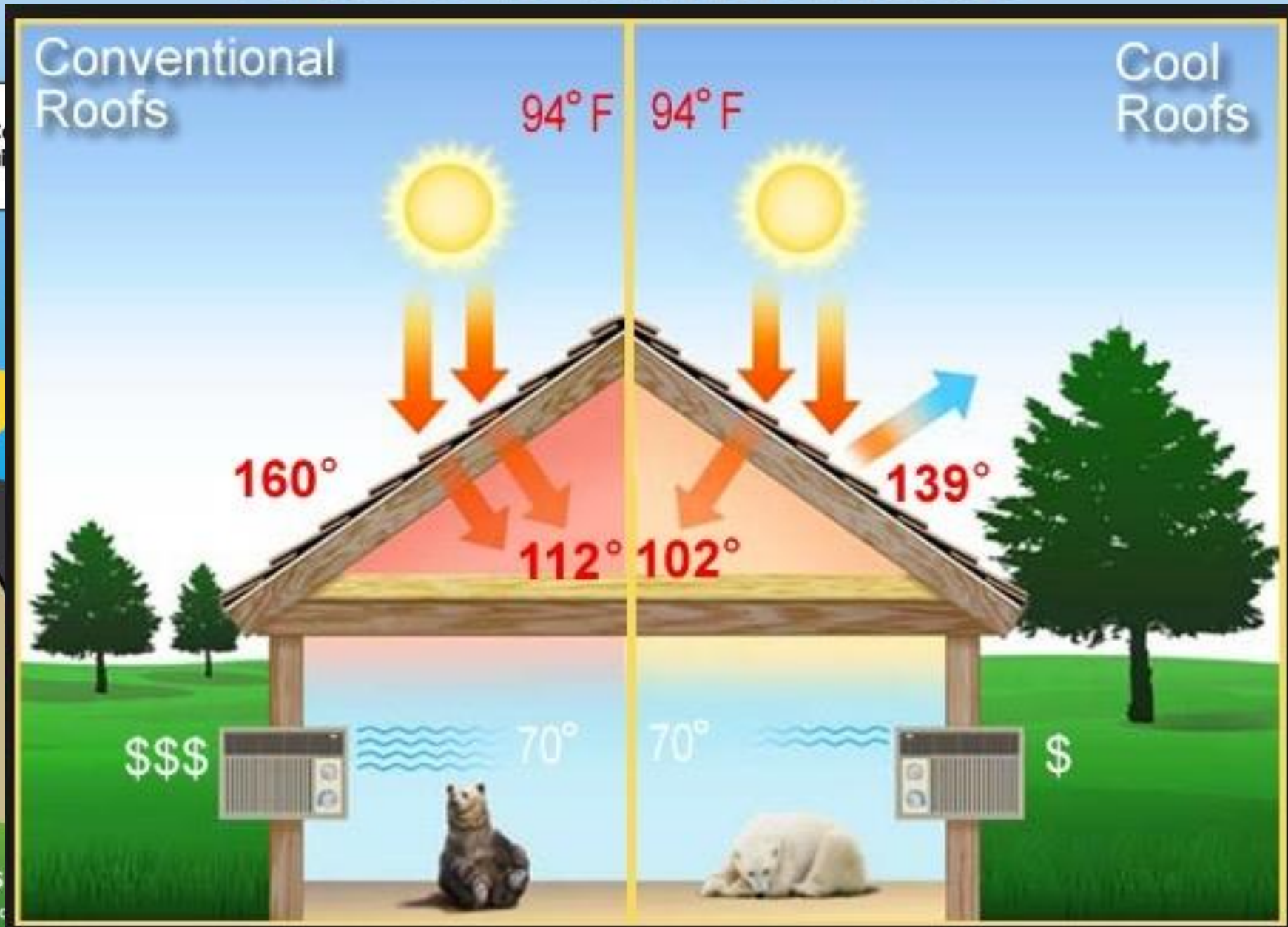
<http://coolcolors.lbl.gov>

<http://www.ioe.org/Images/content/090213/White%20Roofs%20Cool%20the%20World.pdf>

http://www.nytimes.com/2009/07/30/science/earth/30degrees.html?_r=1

<http://newscenter.lbl.gov/feature-stories/2011/07/26/efficacy-of-cool-roofs-varies-from-city-to-city>

Black vs White Roofs



Sources

- <http://coolceiling.com>
- <http://www.iaee.org/images/content/05/02/13/white%20roofs%20cool%20new%20world.pdf>
- http://www.nytimes.com/2009/07/30/science/earth/30degrees.html?_r=1
- <http://newscenter.lbl.gov/feature-stories/2011/07/26/efficacy-of-cool-roofs-varies-from-city-to-city>

Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”

ENERGY
is achieved
solutions
XA or other
“DEEMED
requirement

For:

- Orientation



**Concrete roofs and
suspended floor
insulation**



Up to 35% heat
through un-insu
walls



Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”



ENERGY EFFICIENCY IN BUILDINGS is achieved by compliance with solutions provided in SANS 10400 XA or otherwise described as: “DEEMED TO SATISFY” requirements.

6

For:

- Orientation of building;
- Shading of windows and north face;
- Roof and ceiling insulation;
- Wall performance prescribed;
- Floor insulation; where underfloor heating is installed

Electrical Lighting Regulated

- Heating of water. Use of alternatives to electric resistance heating for water such as solar collectors and heat pumps.



Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”



Lighting

Generally the lighting performance of this standard will be satisfied by the use of LED (light emitting diode) or fluorescent technologies at the minimum lighting lux levels nominated in SANS10114.

The lighting power density as calculated by aggregating the connected lighting energy demand per occupancy and dividing this total by the net floor area for the relevant occupancy, as per table 3 below, shall not exceed the Energy Demand values set out in Table 4.

Table XX; Maximum energy demand and energy consumption for lighting for the class of occupancy or building

1	2	3	4	5
Class of occupancy or building	Occupancy	Population	Energy demand W/m ²	Energy consumption kWh/m ²
A1	Entertainment and public assembly	Number of seats or 1 person/m ²	2	
A2	Theatrical and indoor Sport	Number of seats or 1 person/m ²	8	
A3	Places of instruction	Number of seats or 1 person/m ²	10	
A4	Worship	Number of seats or 1 person/m ²	4	
B1	High-risk Commercial	1 person/15m ²	10	
B2	Moderate-risk Commercial	1 person/15m ²	8	
B3	Low-risk Commercial	1 person/15m ²	6	
C1	Exhibition halls	1 person/10m ²	10	
C2	Museums	1 person/20m ²	4	
D1	High-risk Industrial	1 person/15m ²	8	
D2	Moderate-risk Industrial	1 person/15m ²	6	
D3	Low-risk Industrial	1 person/15m ²	4	
D4	Plant Room	N/A	4	
E1	Places of detention	2 people/bedroom	4	
E2	Hospital	1 person/10m ²	8	
E3	Other institutional residences	1 person/10m ²	8	
E4	Health care	1 person/10m ²	8	
F1	Large Retail	1 person/10m ²	20	
F2	Small Retail	1 person/10m ²	8	
F3	Wholesale store	1 person/20m ²	8	
G1	Offices	1 person/15m ²	8	
H1	Hotels	2 people/bedroom	4	
H2	Dormitory	1 person/5m ²	4	
H3	Domestic residences	2 people/bedroom	4	
H4	Dwelling houses	4 people/house	4	
H5	Hospitality	2 people/bedroom	4	
J1	High-risk storage	1 person/50m ²	4	
J2	Moderate storage	1 person/50m ²	3	
J3	Low-risk storage	1 person/50m ²	2	
J4	Parking areas covered	1 person/50m ²	1	

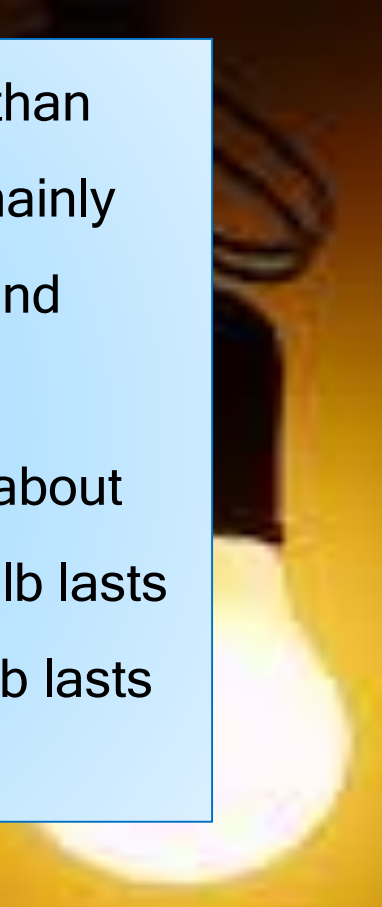
Informative note:
 1. All lighting calculations should assume default factor of 0.80 or 80% maintenance factor.
 2. All lighting to be accordance with SANS10114:2005;
 3. Lamp lumens: the lumen output of all lamps must be stated at 25°C

Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”



Incandescent bulbs cost much less than their energy-efficient alternatives - mainly CFLs (compact fluorescent lamps) and LEDs (light emitting diodes). ...

The typical **incandescent** bulb lasts about 1,000 hours, while a 15-watt CFL bulb lasts 10,000 hours and a 12-watt **LED** bulb lasts 25,000 hours.



Environmental Sustainable Buildings within the Standards – SANS 10400 XA Efficient Energy use in buildings: “Deemed to satisfy”



Incandescent
their energy-
CFLs (compa
LEDs (light e
The typical in
1,000 hours,
10,000 hours
25,000 hours



Replacing that 60W Light Bulb: *a cheat sheet*

The A19 60 watt incandescent light bulb will soon be phased out, per new efficiency standards.



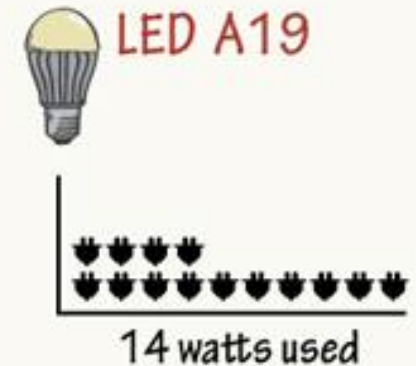
88% as bright as a 60W incandescent



94% as bright as a 60W incandescent



94% as bright as a 60W incandescent




95% as bright as a 60W incandescent

YOU USED TO BUY

YOUR CHOICES NOW

Least efficient

Most efficient

	STANDARD INCANDESCENT	NEW HALOGEN INCANDESCENT	CFL	LED	
					
	40 W \$5.34/yr	29 W \$3.87/yr	10 W \$1.34/yr	5 W \$0.67/yr	Energy use Energy cost per year
	60 W \$8.02/yr	43 W \$5.74/yr	13 W \$1.74/yr	10 W \$1.34/yr	Energy use Energy cost per year
	75 W \$10.02/yr	53 W \$7.08/yr	16 W \$2.14/yr	15 W \$2.00/yr	Energy use Energy cost per year
	100 W \$13.36/yr	72 W \$9.62/yr	20 W \$2.67/yr	19 W \$2.54/yr <i>(limited availability)</i>	Energy use Energy cost per year
	1 year* Typical life	1-2 years Typical life	10 years Typical life	15-25+ years Typical life	

450 Lumens

800 Lumens

1100 Lumens

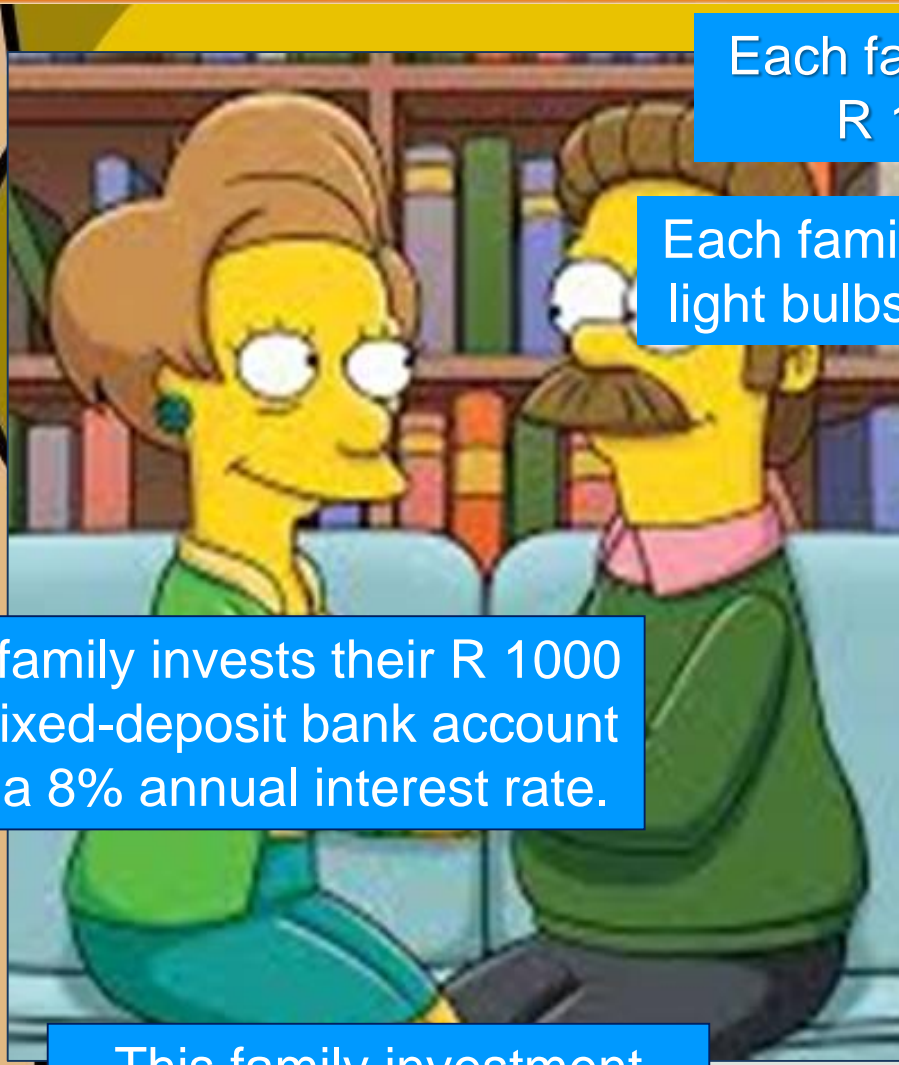
1600 Lumens

Less bright

More bright

*Rated life is based on 3 hours of use per day

Environmental Sustainable Buildings Investment makes FINANCIAL SENSE

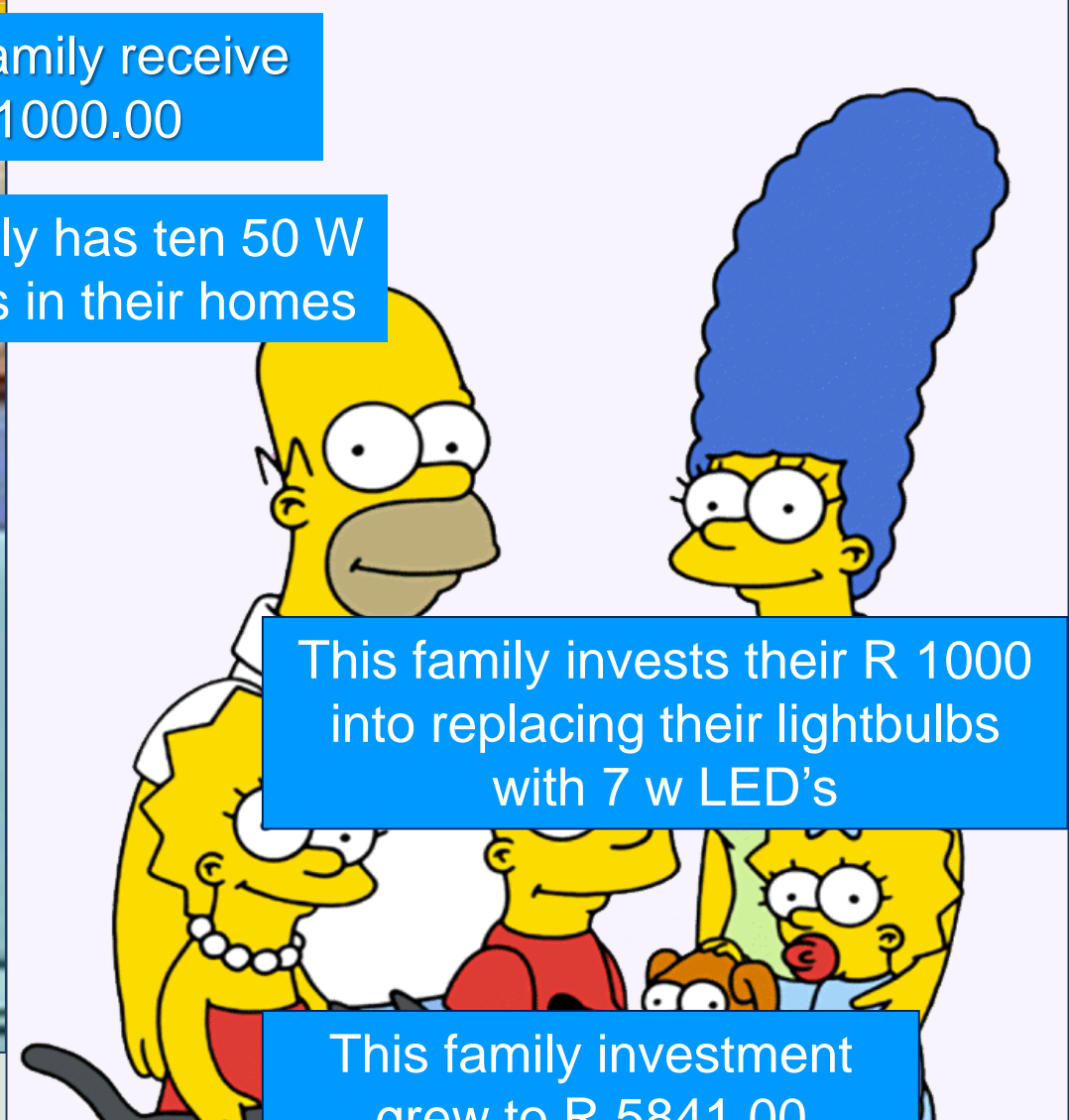


Each family receive
R 1000.00

Each family has ten 50 W
light bulbs in their homes

This family invests their R 1000
in a fixed-deposit bank account
with a 8% annual interest rate.

This family investment
grew to R 1490.00



This family invests their R 1000
into replacing their lightbulbs
with 7 w LED's

This family investment
grew to R 5841.00

Environmental Sustainable Buildings Investment makes FINANCIAL SENSE



Each family receive R 1000.00

Each family has ten 50 W light bulbs in their homes

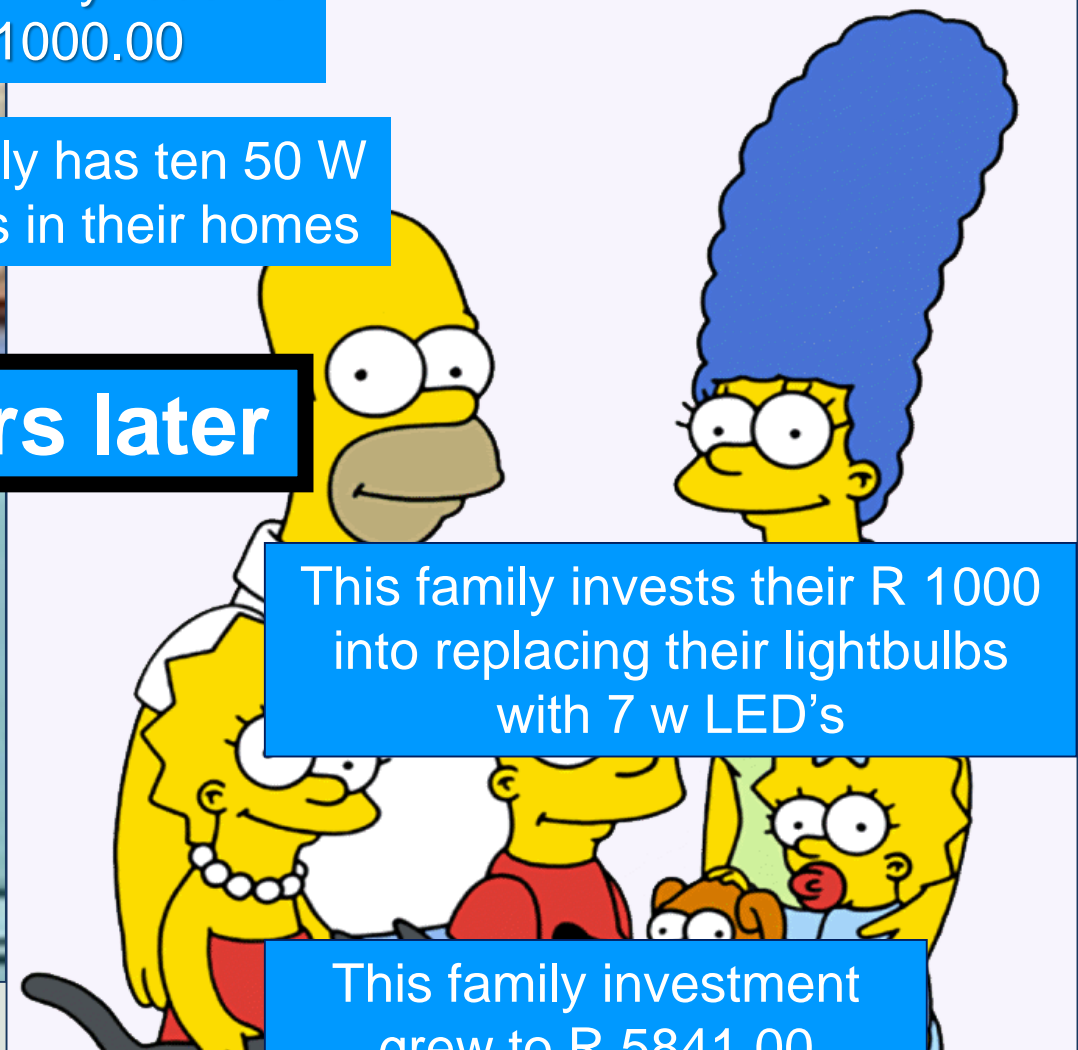
5 years later

This family invests their R 1000 in a fixed-deposit bank account with a 8% annual interest rate.

This family investment grew to R 1490.00

This family invests their R 1000 into replacing their lightbulbs with 7 w LED's

This family investment grew to R 5841.00



Environmental Sustainable Buildings Investment makes FINANCIAL SENSE



This family investment grew to R 1490.00

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This family investment grew to R 5841.00

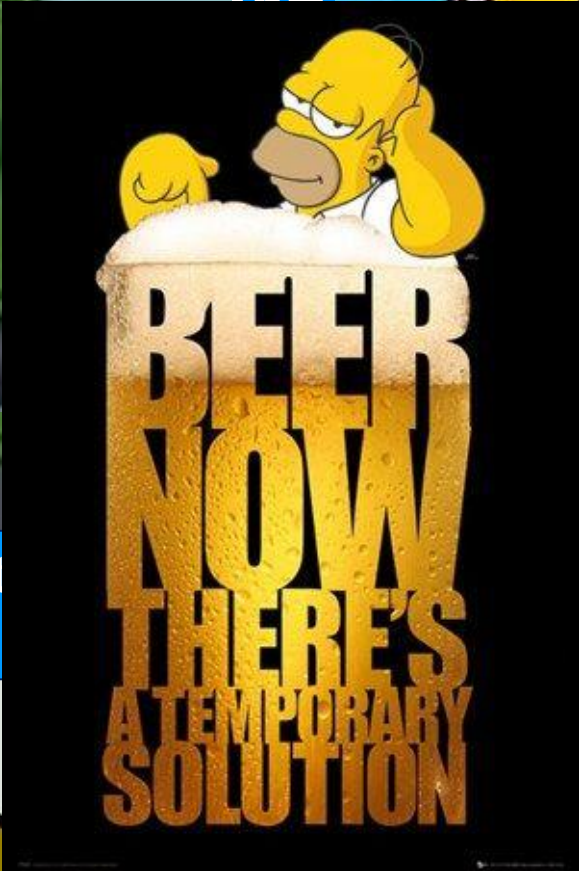
Environmental Sustainable Buildings Investment makes FINANCIAL SENSE



family
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This family investment
grew to R 1490.00



This family investment
grew to R 5841.00

Building Regulation: Energy Efficiency in Buildings satisfied by the “Deemed to satisfy” rules provided in; SANS 10400-XA: 2017



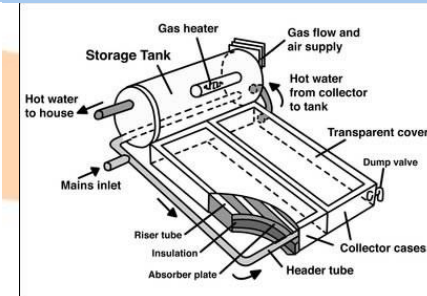
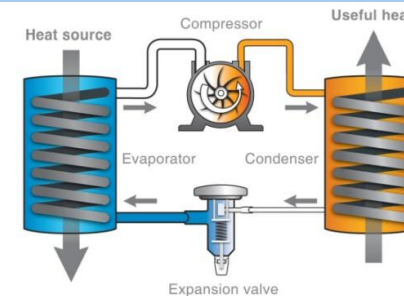
ENERGY EFFICIENCY IN BUILDINGS is achieved by compliance with solutions provided in SANS 10400 XA or otherwise described as: “DEEMED TO SATISFY” requirements.

7

For:

- Orientation of building;
- Shading of windows and north face;
- Roof and ceiling insulation;
- Wall performance prescribed;
- Floor insulation; where underfloor heating is installed
- Electrical lighting regulated.

Heating of water. Use of alternatives to electric resistance heating for water such as solar collectors and heat pumps



SANS 10400 Part XA 2017

Hot water supply

- **In order for solar geysers with back-up elements to comply with the demand requirement for hot water as per Regulation XA3, the following shall be deemed to satisfy the requirement:**

Solar water heating systems shall comply with SANS 1307, SANS 10106, SANS 10254 and SANS 10252-1.

The capacity of the storage tanks for solar geysers fitted with a back-up electrical element capacity is equal or more than that stated in table 10

The roof structure supporting storage tanks and solar collectors shall satisfy the requirements of SANS10400-B and SANS10400-L

The installation must be done by a registered plumber and a Certificate of Compliance has to be issued.

- **In order for domestic heat pump installations to comply with the demand requirement for hot water as per Regulation XA3, the following shall be deemed to satisfy the requirement:**

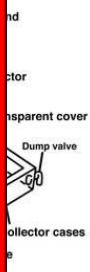
Domestic heat pump systems shall comply with SANS 1503, SANS 10254 and SANS 10252-1.

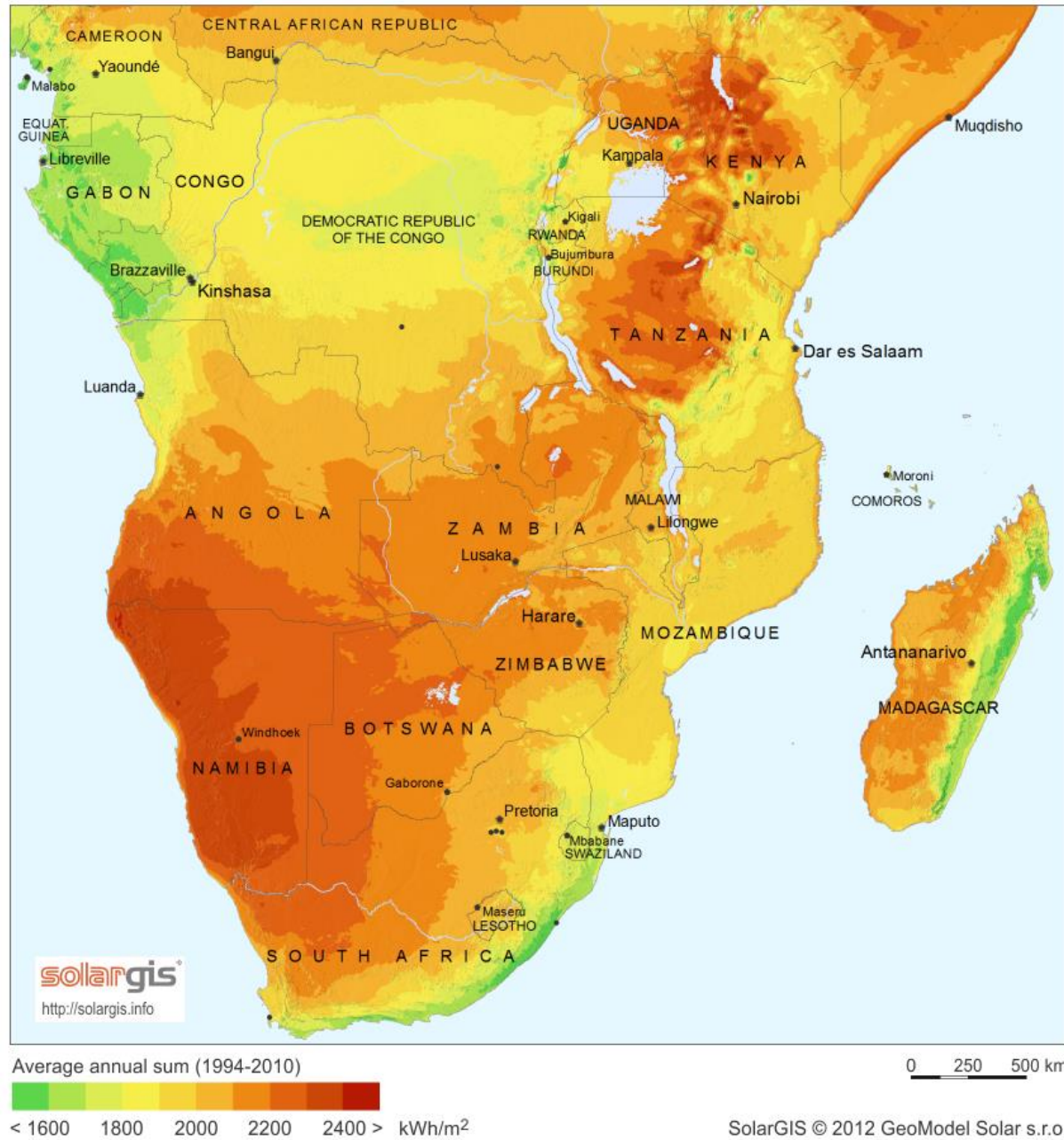
The roof structure supporting storage tanks shall satisfy the requirements of SANS10400-B and SANS10400-L

The installation must be done by a registered plumber and a Certificate of Compliance has to be issued.



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Only a guide;

A 150 litre solar water heating system on the basis that most are around 70% -80% efficient will just be adequate for 2 people.

If there are 3 to 4 people, a 200 litre system is needed (on the same assumption of efficiency).

For 4 -6 people from 300 litres or more is needed.

1503, SANS 10254 and SANS 10252-1. by the requirements of SANS10400-B

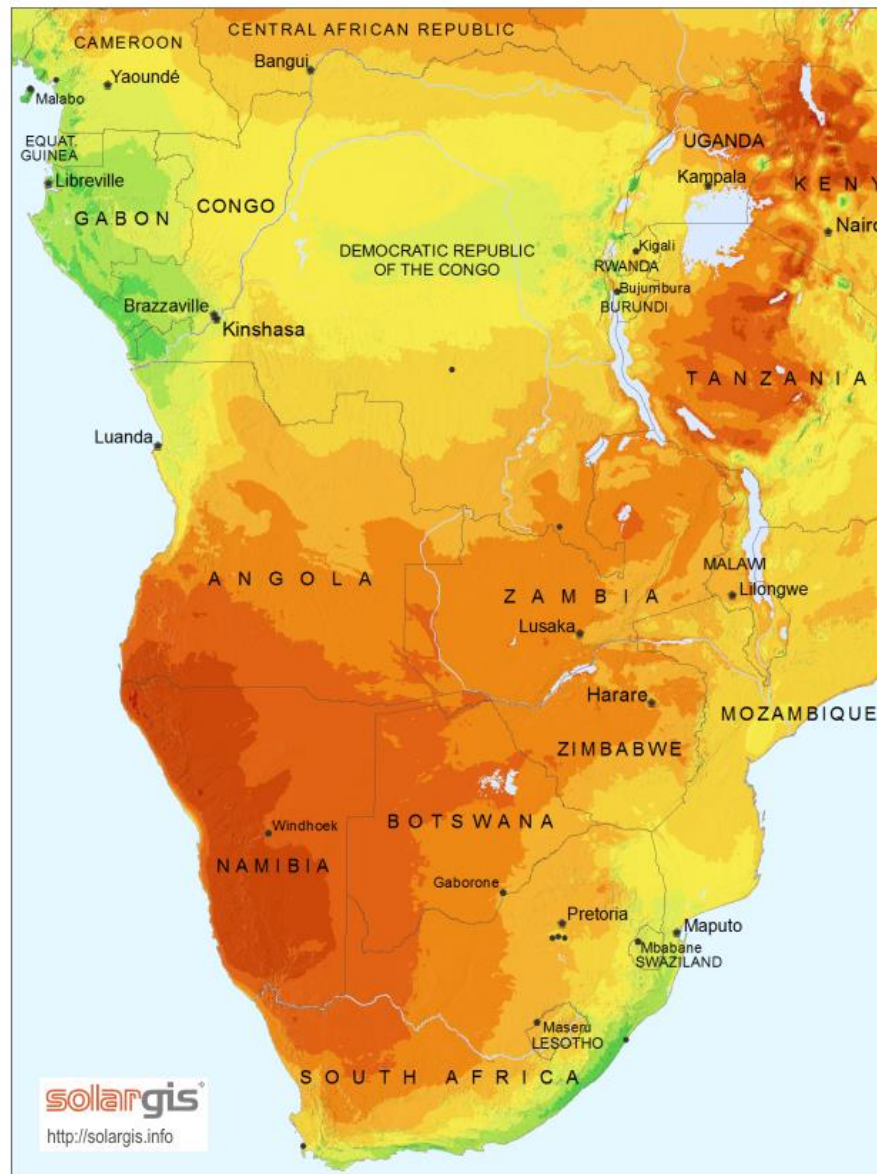
ber and a Certificate of Compliance

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has to be issued.



Global horizontal irradiation



Average annual sum (1994-2010)



SolarC

1	2	3
Premises	Total hot water demand	Storage capacity (60°C)
Clinics	120 L/bed/d	60 L/bed/d
Colleges and schools:		
Day school	10 L/capita/d	10 L/capita
Boarding school	50 L/capita/d	50 L/capita
Dwelling		
houses: Low rental	80 L/capita/d	(100 to 150) L/unit
Medium to high rental	115 L/capita/d	(40 to 50) L/capita
Factories:		
Staff Ablutions	10 L/capita/d (30 to 60) L/capita/d	(5 to 7) L/capita/d (30 to 60) L/capita/d
Flats (blocks):		
Low rental	(65 to 75) L/capita/d	(20 to 25) L/capita
Medium to high rental	(115 to 140) L/capita/d	(25 to 35) L/capita
Hospitals:		
General Infectious	(130 to 140) L/bed/d	(25 to 30) L/bed/d
Infirmaries	(220 to 230) L/bed/d	(40 to 50) L/bed/d
Infirmaries with laundry	(65 to 75) L/capita/d	(20 to 25) L/capita/d
Maternity	(85 to 95) L/capita/d	(25 to 30) L/capita/d
Mental	(220 to 230) L/bed/d	(30 to 35) L/bed/d
Nurses' homes	(85 to 95) L/capita/d (120 to 130) L/capita/d	(20 to 25) L/capita/d (40 to 50) L/capita/d
Hostels	(80 to 120) L/capita/d	(30 to 35) L/capita/d
Hotels:		
with resident staff	(120 to 140) L/bed/d	(50 to 70) L/bed/d
without resident staff	(100 to 120) L/bed/d	(40 to 60) L/bed/d
Kitchens:		
Full meal preparation	(5 to 7) L/meal	(5 to 6) L/meal
Offices:		
with canteens	(25 to 28) L/capita/d	(20 to 25) L/capita/d
without canteens	(10 to 12) L/capita/d	(5 to 7) L/capita/d
Shops (staff only)	(10 to 12) L/capita/d	(5 to 6) L/capita
Sports pavilions (participants only)	(30 to 40) L/capita/d	(30 to 40) L/capita/d

he
co

has to be issued.

Water Services - Building Regulations W



Against a global rainfall average of 870mm per year, South Africa receives a pitiful 450mm, making it the worlds 30th driest country.





Water Services - Water installations in buildings

The **Water Services Act, 1997** (Act No. 108 of 1997) enables the Minister of Water Affairs to **prescribe compulsory national standards** relating to **consumer installations**



Regulation 14 of R 509 (8 June, 2001) reads as follows:

*Every **consumer installation must comply with SABS 0252-1** (SANS 10252-1), **Water supply and drainage for buildings and SABS 0254** (SANS 10254), **The installation, maintenance, replacement and repair of fixed electric storage water heating systems, or any other similar substituting re-enactment or amendment thereof if the consumer installation is of a type regulated by either standard.***

SANS 10252-1 establishes general principles for the design, installation and testing of water installations.

Water Services - Water installations in buildings

The **Water Services Act, 1997** (Act No. 108 of 1997) enables the Minister of Water Affairs to **prescribe compulsory national standards** relating to **consumer installations**

The National Building Regulations do **not contain** any provisions that relate to **water installations in buildings** except those pertaining to **fire installations** (see part W: Fire Installations).

Therefore, consumer installations are regulated by SANS 10252-1 and SANS 10254.



Water Services - Building Regulations: Close the Gap

Wet services included in the NBR's:

1. Control of plumbers and plumbing work (Regulation A18)
 - Drainage (P)
 - Non-water-borne means of sanitary disposal (Q)
 - Stormwater disposal (R)
 - Fire services (W)

NO WATER SUPPLY INSTALLATIONS in NBR.

1. Regulations (2001) under the Water Services Act make compliance with **SANS 10252/10254** mandatory
2. DWA lacks capacity to enforce.
3. By-laws enforced by Local Authorities water authority.
4. NRCS identified the need to close the gap.
5. **DTI & DWA agree in principle to replicate regulations**



A time to ask those questions not yet answered

Q&A

You have

Questions

We have

Answers

Contact details

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Technical Advisor: Architecture and National Building Regulations

e-mail: oppermrw@nrccs.org.za

Where to get the presentation

Nrcs - Home

▶ Legal Metrology

▼ National Building Regulations

▶ Review Board Decisions

▶ Roadshows

▶ 2016 BCOS Convention

▶ Overview

▶ BCOSC

▶ Case Register

▶ RRD

NRCS

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NRCS ONLINE SYSTEM

The NRCS has implemented an Online system on the 1st of September 2016

ABOUT US - Overview. The right of the public to health, safety and ...

Applications. INTERNAL ...