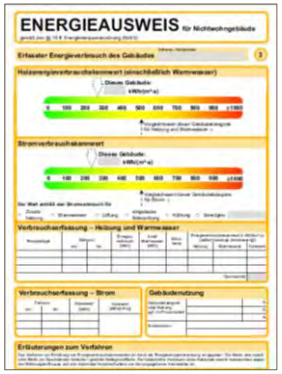


Building Energy Data

Christian Borchard, Int. Advisor Energy Efficiency GIZ/SAGEN

28. Januar 2015, IEA & DoE Workshop, Pretoria

City Council of Frankfurt/Main

STADT FRANKFURT AM MAIN

Energy performance certificate

In accordance with Sections 16 ff. EnEV — Valid until: 2024/11/24

Building	Construction Bureau	
Address	Gerbermühlstrasse 48	
Main usage	Administrative building with normal technical equipme	9 711 m²
Sonderzone	Care centers	350 m²
Net floor space		10 062 m²

Heating energy — specific consumption 2006 - 2009 (including hot water) — **Costs/year**

This property: 61 kWh/m²a — 26 687 €/a

0	71	89	104	120	139	175	kWh/m²a
efficient A	B	C	D	E	F	G	inefficient

Vergleichswert EnEV 2009: 88 kWh/m²a — 2.65 €/m²a

Power — specific consumption 2006 - 2009 — **Costs/year**

This property: 31 kWh/m²a — 46 162 €/a

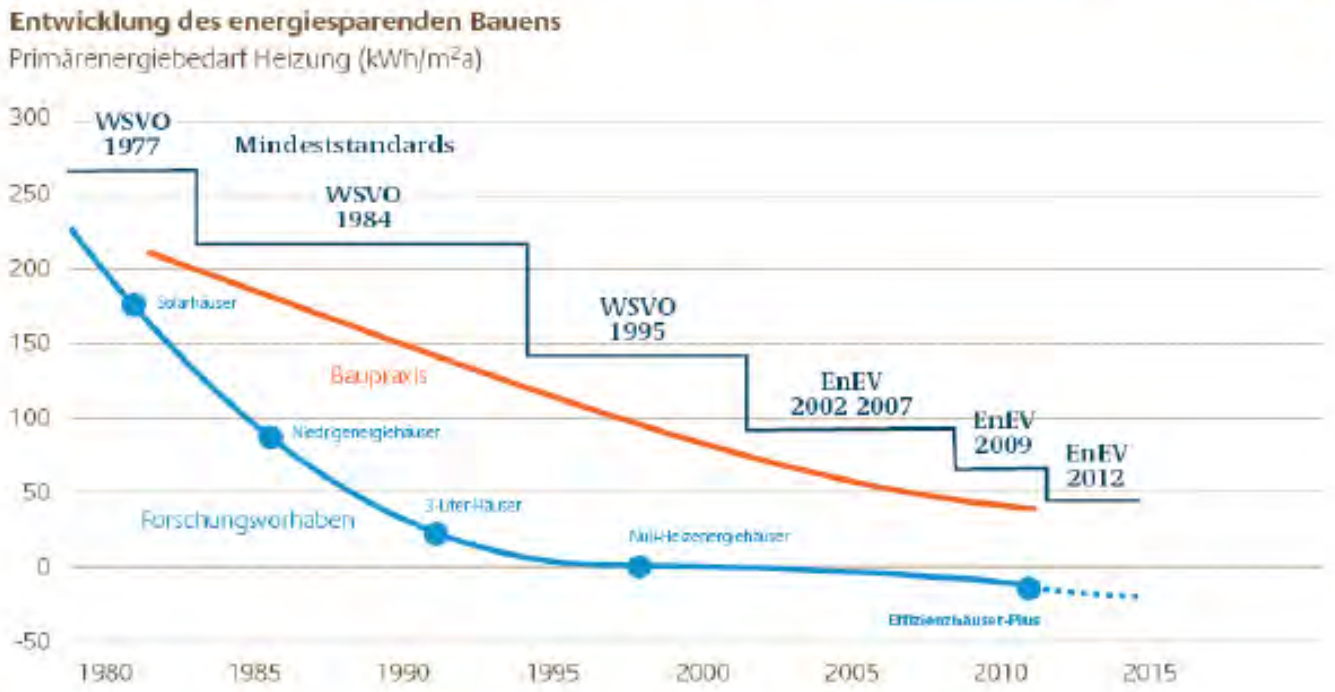
0	14	19	25	30	36	49	kWh/m²a
efficient A	B	C	D	E	F	G	inefficient

4.59 €/m²a

... Certificate | Umrechnung BGF-NGF | Klassengrenzen Heizung | Klassengrenzen Strom | Klasseng ...

Germany:

Reduction of energy demand of residential buildings



- 1977: Thermal Insulation Ordinance (WSchV 1977)
- 1984: Thermal Insulation Ordinance (WSchV 1984)
- 1995: Thermal Insulation Ordinance (WSchV 1995)
- 2002: EnEV 2002
- 2004: EnEV 2004
- 2007: EnEV 2007
- 2009: EnEV 2009

Wednesday 11 Sep 2013

City Council of Frankfurt/Main

Category limits for electricity

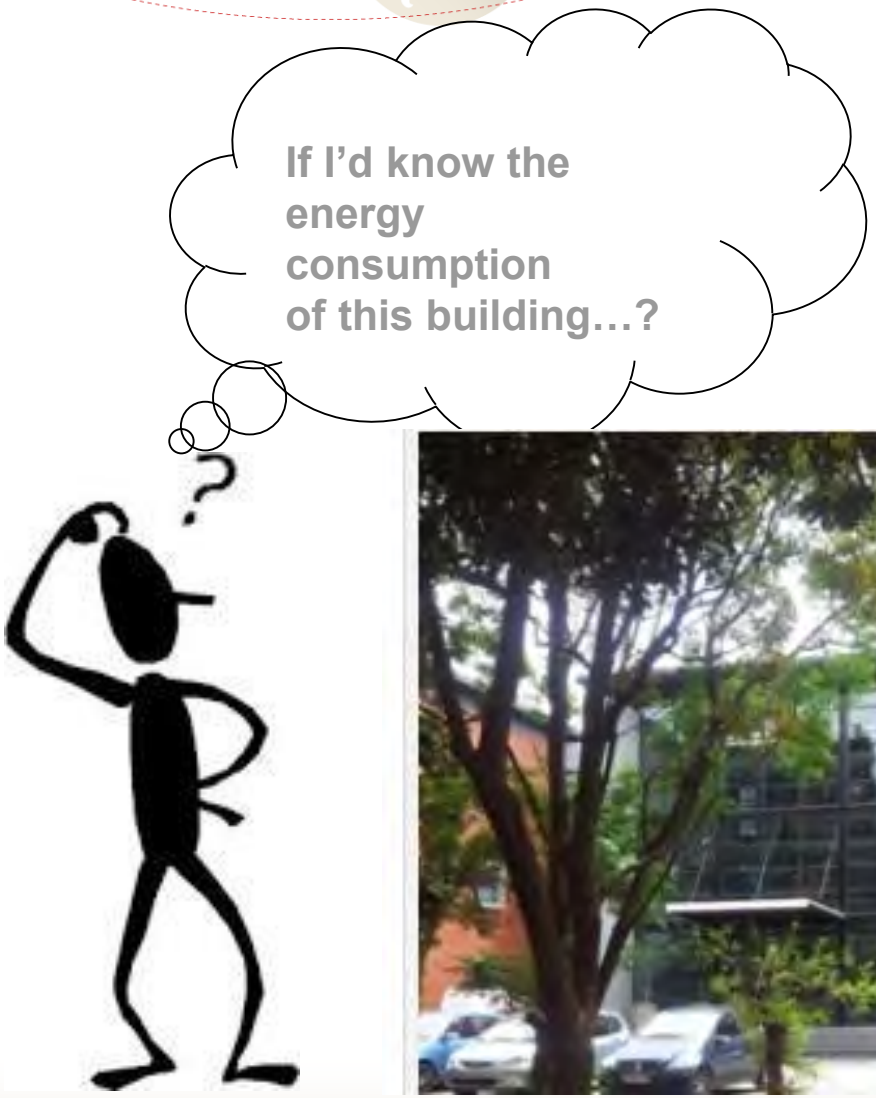
Year of completion: 2004
Size: net floor area

Data source: IEMB database as of: 09.11.2006

Flow-off rates for roofs

BZK	Building category	Numbe Values	Lower limits for categories (kWh/m²a) A	B	C	D	E	F	G	2007 mparative values in E (kWh/m²a) <=3,500 m²	(kWh/m²a) >3,500 m²	2009 based omparative values in EnE (kWh/m²a) <=3,500 m²	(kWh/m²a) >3,500 m²
1100	Parliamentary building	34	0.0	19.0	25.2	30.0	33.5	49.2	67.1	43	43	40	40
1200	Court buildings	637	0.0	13.5	16.4	20.9	24.0	28.9	36.4	25	35	20	25
1300	Administration buildings	4 562	0.0	14.7	20.3	25.8	32.4	40.9	55.2	37	45	20	30
1310	Administrative building with normal tech	2 270	0.0	14.1	19.1	23.9	28.7	35.0	46.5	33	40	20	30
1313	City halls	51	0.0	20.8	26.9	34.1	38.1	42.4	53.9	36	40	35	35
1320	Administrative buildings with a lot of equ	164	0.0	12.9	20.6	32.0	44.6	57.2	98.6	53	65	40	40
1340	Police building	1 812	0.0	15.8	22.7	30.4	38.1	47.6	63.0	41	40	30	30
1350	Data centers	12	0.0	124.0	125.9	143.6	211.9	311.9	558.0	231	220	155	155
2000	Educational/research building	866	0.0	15.8	24.7	35.5	48.8	69.5	116.4	75	75	65	65
2100	Lecture halls	37	0.0	19.5	29.1	42.7	46.5	52.9	103.1	60	60	40	40
2200	Research and educational institutes	463	0.0	14.3	22.8	32.0	46.4	63.3	113.3	74	75	65	65
2300	Research institutes	149	0.0	16.8	35.8	56.8	81.2	108.8	147.8	83	90	65	65
3200	Hospitals for acute diseases	17	0.0	46.9	89.0	121.1	150.9	153.8	216.4	128	128	125	80
3300	Special clinics (addictions, etc.)	30	0.0	39.3	43.8	51.0	55.7	61.1	71.8	55	55	135	135
3400	Care centers (elderly, handicapped)	17	0.0	17.8	28.8	35.9	43.9	49.5	63.0	40	40	40	40
4000	Schools	3 126	0.0	8.5	11.0	13.6	17.4	22.6	30.6	19	20	15	15
4100	General schools	1 571	0.0	7.6	9.5	11.4	13.3	16.1	21.2	15	15	10	10
4110	Elementary schools	684	0.0	7.3	9.2	11.1	13.0	15.3	20.0	14	15	10	10

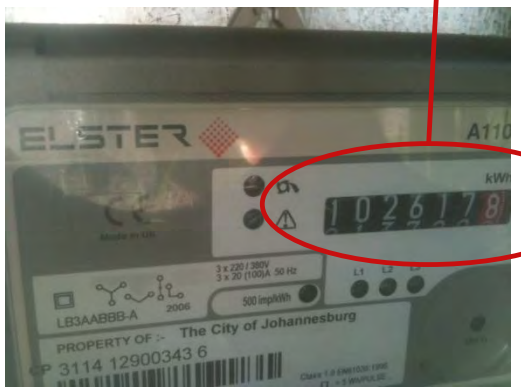
... Klassengrenzen Strom | Klassengrenzen Wasser | Klimafaktor | Mittelung Klassengrenzen

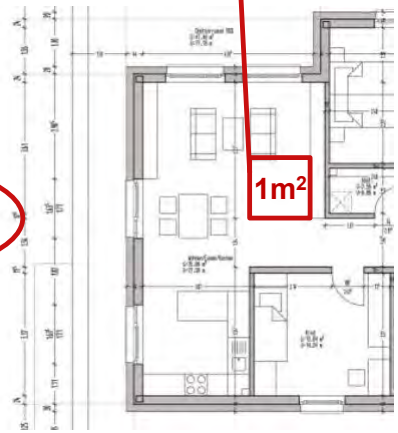

If I'd know the energy consumption of this building…?

Source: dena

Let's speak

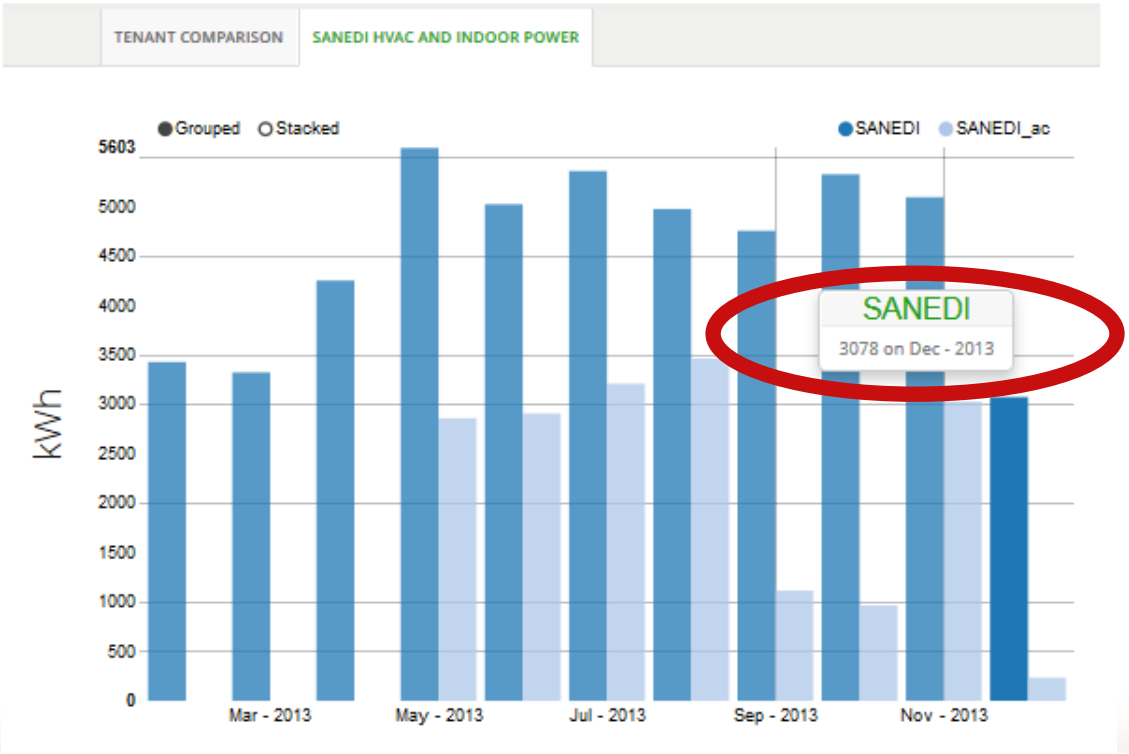
kWh / (m²·a)





6000 kWh
in Dec 2013…
Is that **HIGH** or
LOW energy
consumption?

SANEDI Building Energy Consumption Feed

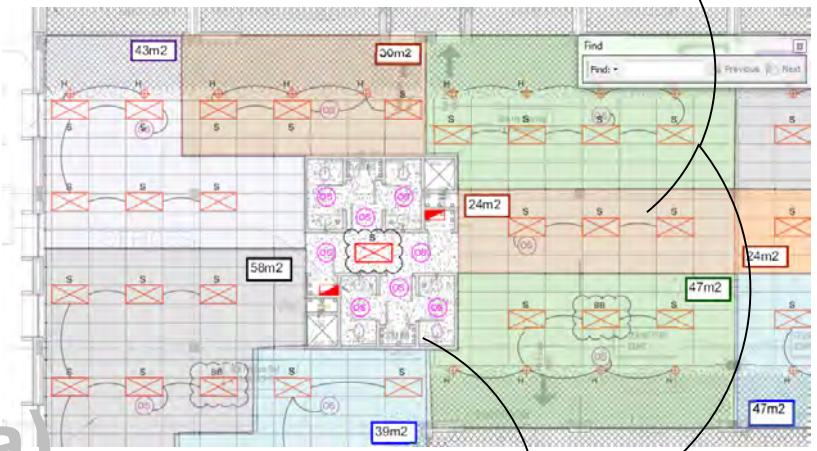


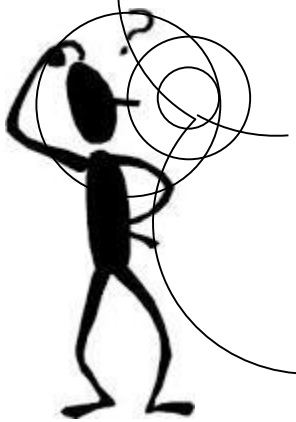
6000 kWh for Dec 2013…
94,000 kWh for Jan-Nov 2013
Ca. 100,000 kWh total 2013

Rental space: ca. 1,000 m2

kWh / (m²·a)
100,000 / (1,000 x 1) =

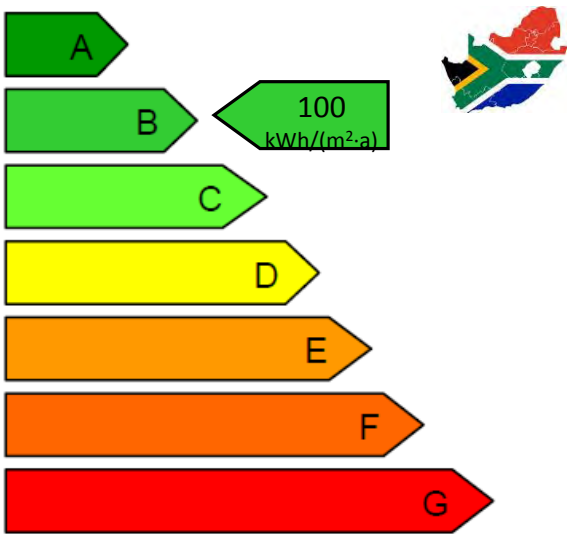
100 kWh/ (m²·a)

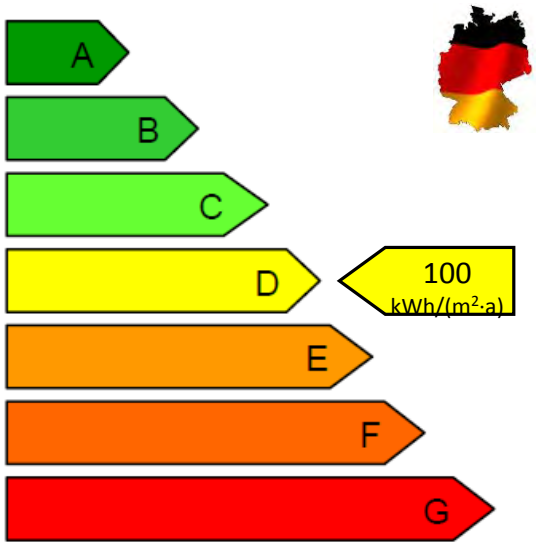




Is that HIGH or LOW energy consumption?

Office building: 100 kWh/ (m^2·a) (electricity) high or low ?





Some more work to do in SA!

Table 3 — Maximum annual consumption per building classification for each climatic zone

1	2	3	4	5	6	7	8
Classification of occupancy of building	**Description of building**	**Maximum energy consumption kWh/m²**					
		Climatic zone[a]					
		1	**2**	**3**	**4**	**5**	**6**
A1	Entertainment and public assembly	420	400	440	390	400	420
A2	Theatrical and indoor sport	420	400	440	390	400	420
A3	Places of instruction	420	400	440	390	400	420
A4	Worship	120	115	125	110	115	120
F1	Large shop	240	245	260	240	260	255
~~C1~~	~~Offices~~	~~200~~	~~190~~	~~210~~	~~185~~	~~190~~	~~200~~
H1	Hotel	650	600	585	600	620	630

NOTE 1 The annual consumption per square metre shall be based on the sum of the monthly consumption of 12 consecutive months.

NOTE 2 Non-electrical consumption, such as fossil fuels, shall be accounted for on a non-renewable primary energy thermal equivalence basis by converting megajoules to kilowatt hours.

[a] The climatic zones shall be as given in annex A.

South African SANS 10400XA/204 – Prescriptive path to compliance

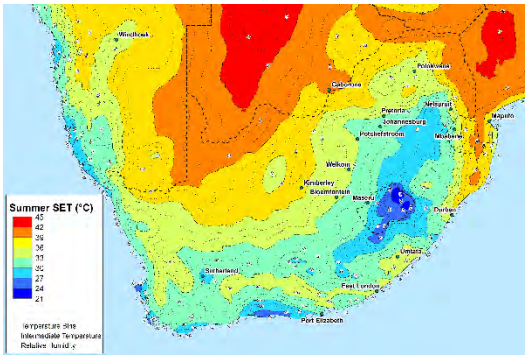
Source: SABS

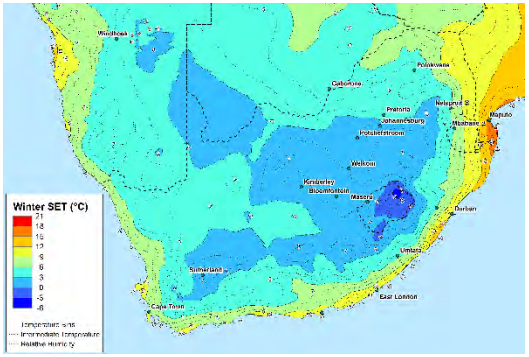
Use (examples)	Comparative value according to the ordinance of 2009	
	Heating and hot water	Electricity
	final energy ~~demand~~ Consumption! [kWh/(m² a)]	
Hotels, mid-range	85	55
Restaurants	205	95
Cinema	55	80
Gyms	120	35
Multipurpose halls	240	40
Indoor swimming pools	385	105
Non-food trade, small	135	45
Food trade, small	125	75
Department stores, shopping centres	70	85
Hospitals, large	175	80
Office buildings, only heated	105	35
Office buildings, heated and ventilated	110	85

German Energy Saving Ordinance 2009

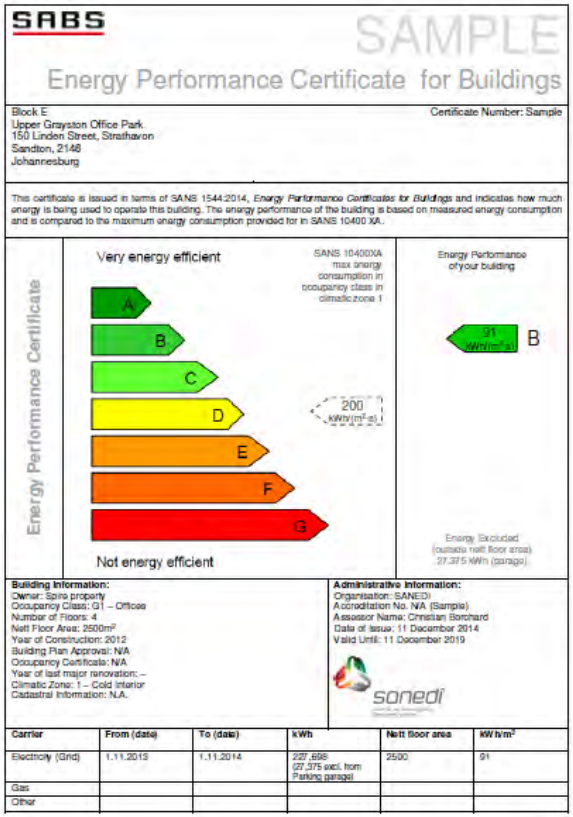
Source: BBSR, Schettler-Koehler, Kunkel

Progress in SA





Revision of climatic maps



SABS

SAMPLE

Energy Performance Certificate for Buildings

Block E
Upper Grayston Office Park
150 Linden Street, Strathavon
Sandton, 2146
Johannesburg

Certificate Number: Sample

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

Energy Performance Certificate

Very energy efficient

SANS 10400XA max energy consumption in occupancy class in climatic zone 1

A
B
C
D
E
F
G

200 kWh/(m²·a)

Not energy efficient

Energy Performance of your building

91 kWh/(m²·a) B

Energy Excluded (outside nett floor area) 27,375 kWh (garage)

Building Information:
Owner: Spire property
Occupancy Class: G1 – Offices
Number of Floors: 4
Nett Floor Area: 2500m²
Year of Construction: 2012
Building Plan Approval: N/A
Occupancy Certificate: N/A
Year of last major renovation: –
Climatic Zone: 1 – Cold Interior
Cadastral Information: N.A.

Administrative Information:
Organisation: SANEDI
Accreditation No. N/A (Sample)
Assessor Name: Christian Borchard
Date of Issue: 11 December 2014
Valid Until: 11 December 2019

sanedi

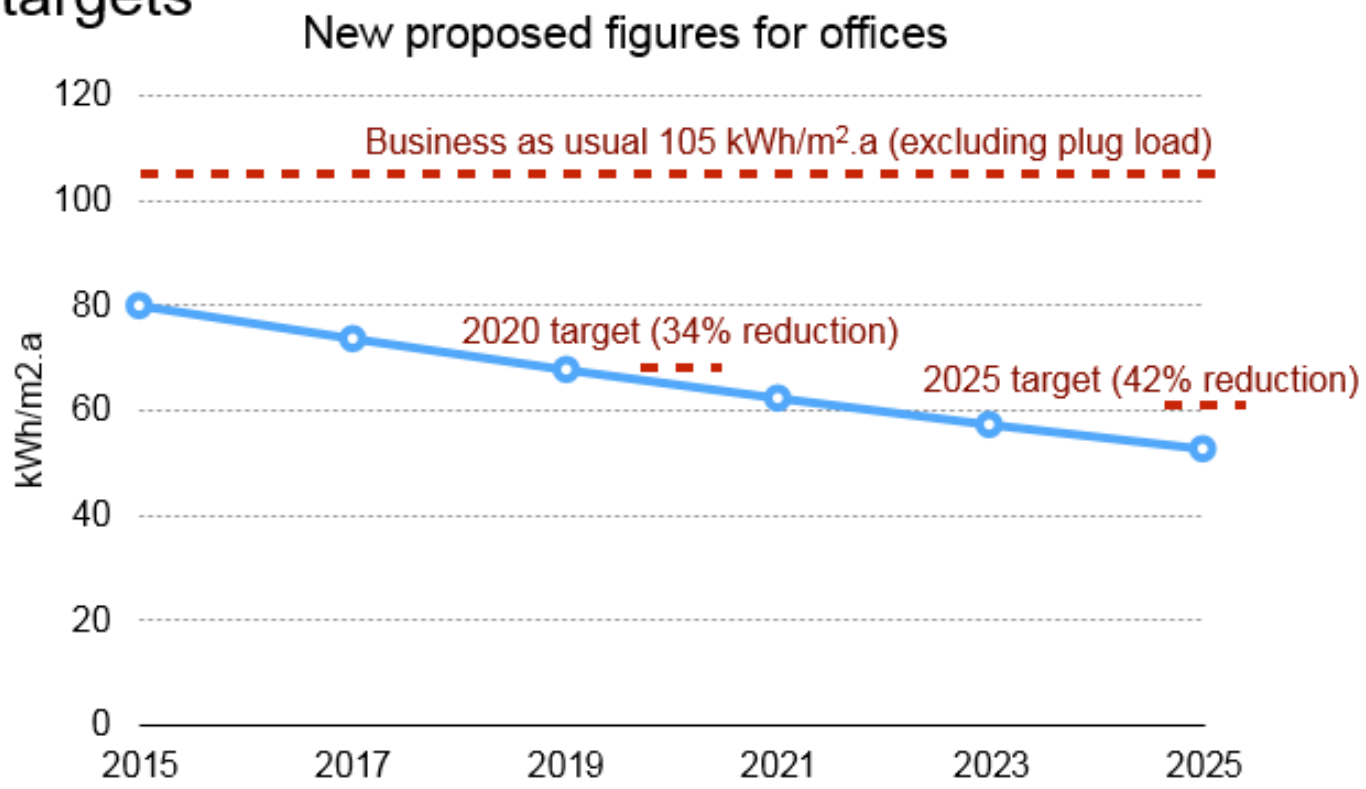
Carrier	From (date)	To (date)	kWh	Nett floor area	kWh/m²
Electricity (Grid)	1.11.2013	1.11.2014	227,696 (27,375 excl. from Parking garage)	2500	91
Gas					
Other					

1st SA EPC (SANS 1544)

Proposal for revision of SANS 204/SANS 10400XA max. energy consumption data (plug load & operational energy)

Classification	Maximum regulated energy consumption [kWh/m2.a]	Anticipated plug load [kwh/m2.a]
Entertainment and public assembly	88	45
Theatrical and indoor sport	96	45
Places of instruction	58	28
Worship	52	45
Large shop	146	38
Offices	80	45
Hotel	104	42
***NEW:* Residential**	56	24
Hospitals	134	62

Continued revision of maximum allowable energy targets



8% reduction on previous allowance required every two years

Thursday 12 Sep 2013

KfW Promotional Bank, Frankfurt

KfW Promotional Programme: Energy Efficient Refurbishment

What incentives are offered?

Support/Bonus	Subsidised low interest loans	Partial debt relief (bonus)
KfW-115 Effizienzhaus	1.0% p.a. (eff.)	7.5 % up to R52,500
KfW-Denkmal Effizienzhaus	1.0% p.a. (eff.)	10.0 % up to R105,000
KfW-100 Effizienzhaus	1.0% p.a. (eff.)	12.5 % up to R131,250
KfW-85 Effizienzhaus	1.0% p.a. (eff.)	15.0 % up to R157,500
KfW-70 Effizienzhaus	1.0% p.a. (eff.)	17.5 % up to R183,750
KfW-55 Effizienzhaus	1.0% p.a. (eff.)	20.0% up to R210,000

Thank you!

South African - German Energy Programme (SAGEN)
Energy Efficiency Component

Christian.Borchard@giz.de