South Africa's energy crisis: "We shall not solve a problem by the thinking that caused the problem" Albert Einstein - Multi-disciplinary impacts of Renewable Energies

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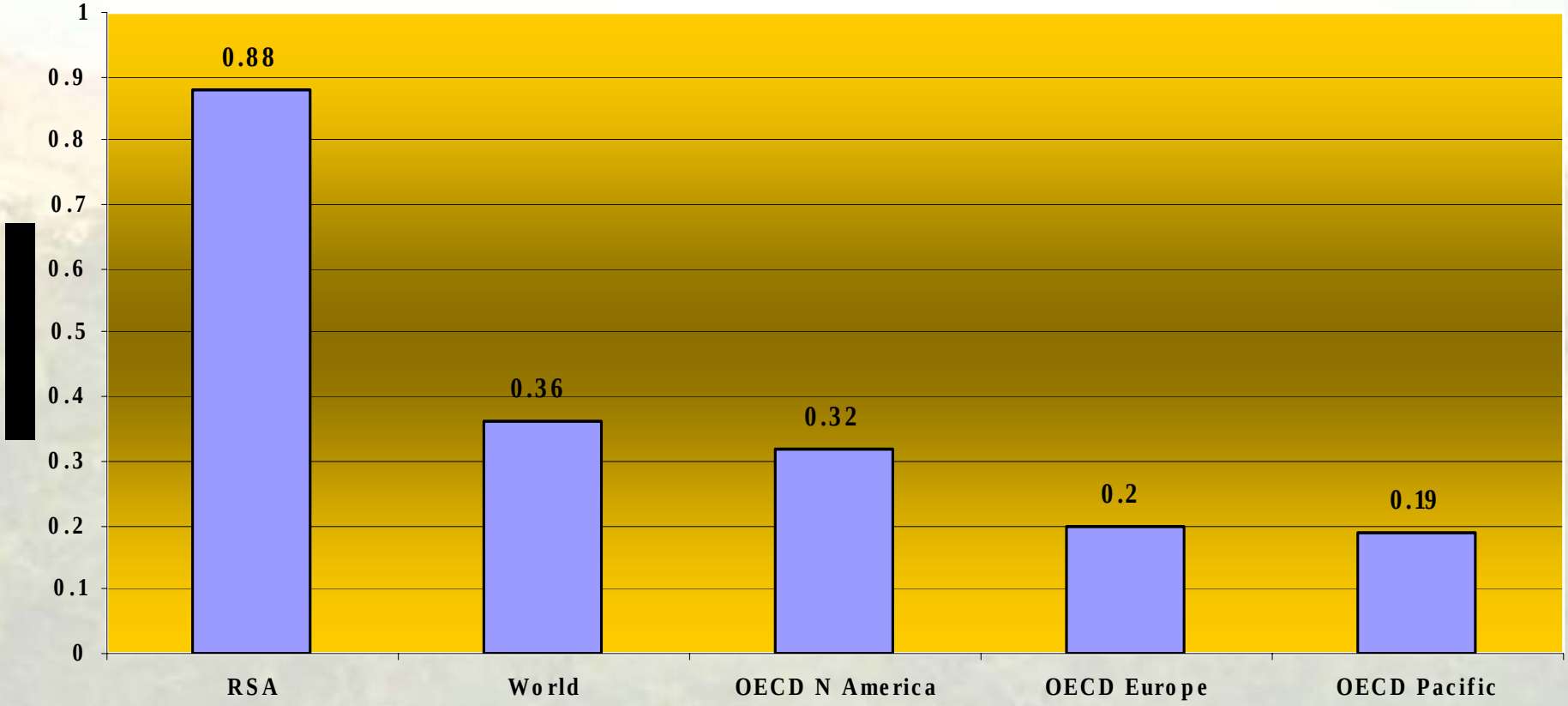
Action plan

1. **Awareness, information, education & training**
2. **Stakeholder involvement, public ownership/buy-in**
3. **Legislation & regulation**
4. **Industry standards, planning permits & building regulations**
5. **Financial interventions & incentives**

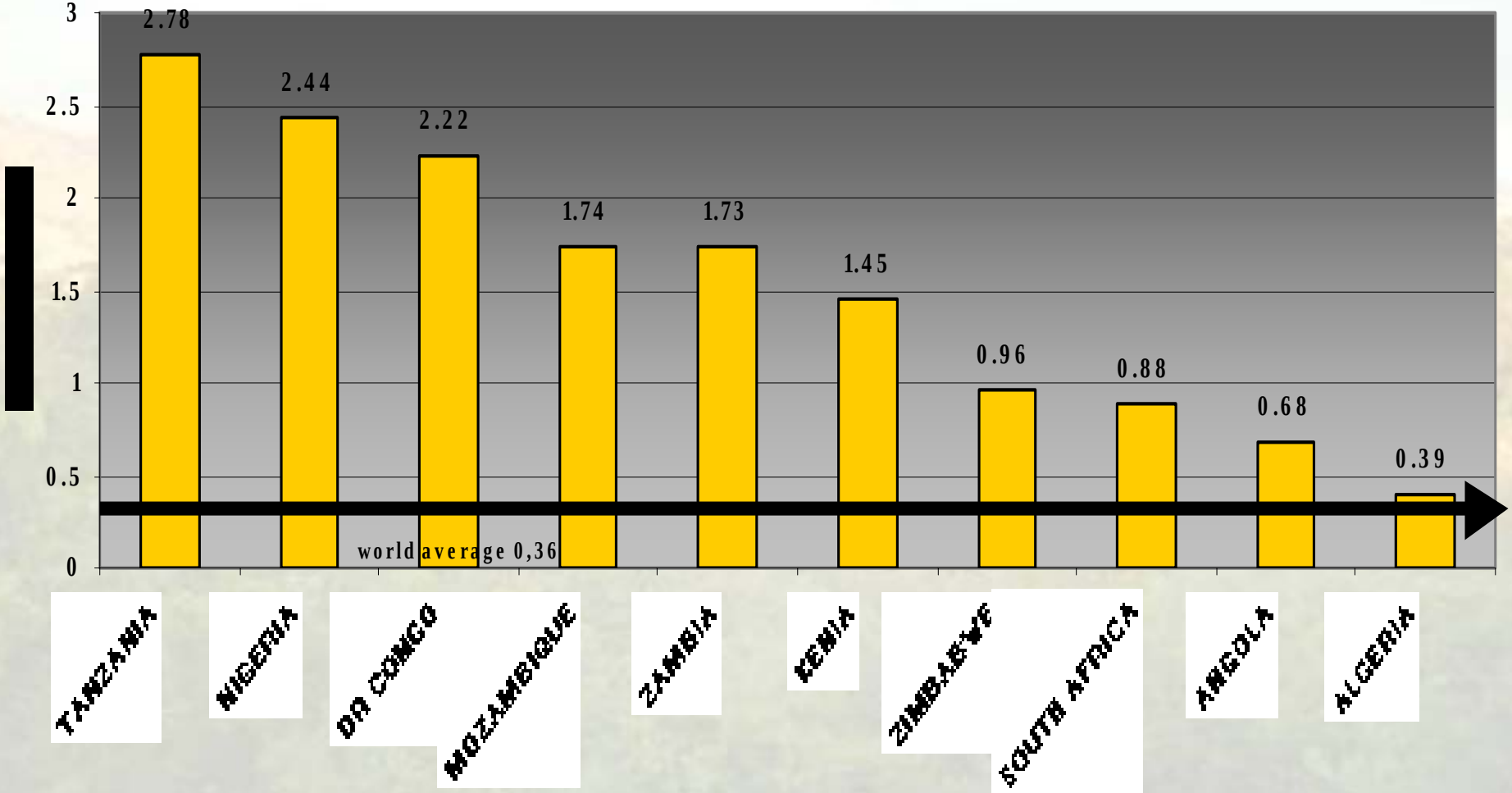
1. Awareness, info, education & training

- **South Africa contributes 4 times as much to global pollution than to the global GDP**
- **South Africa is very energy intensive**
- **South African economy is based on non-sustainable fossil energy**
- **The world is moving to energy efficiency & renewable energies for SD**

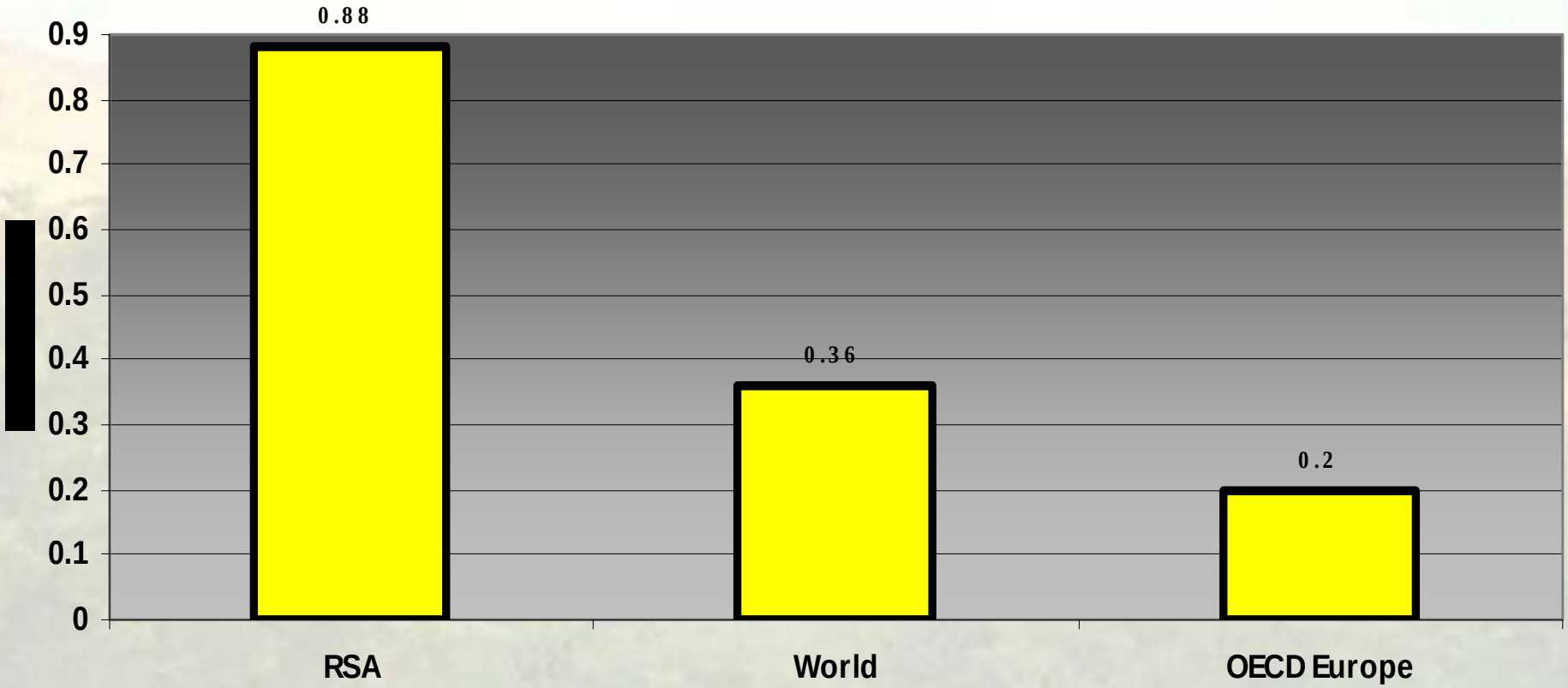
PRIMARY ENERGY/GDP (IEA 98 ii:456-61)

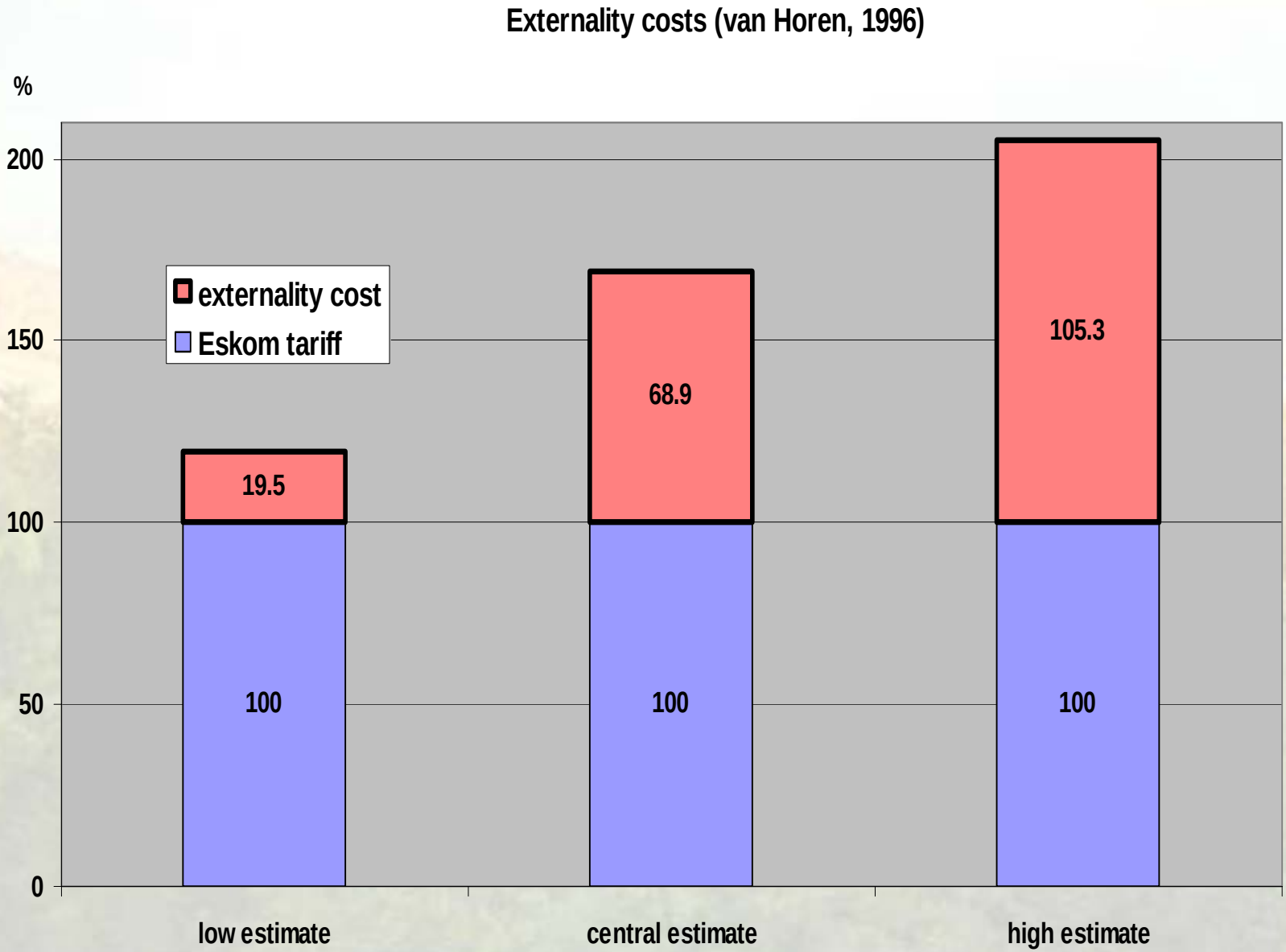


PRIMARY ENERGY per GDP (IEA 98 ii:456-61)

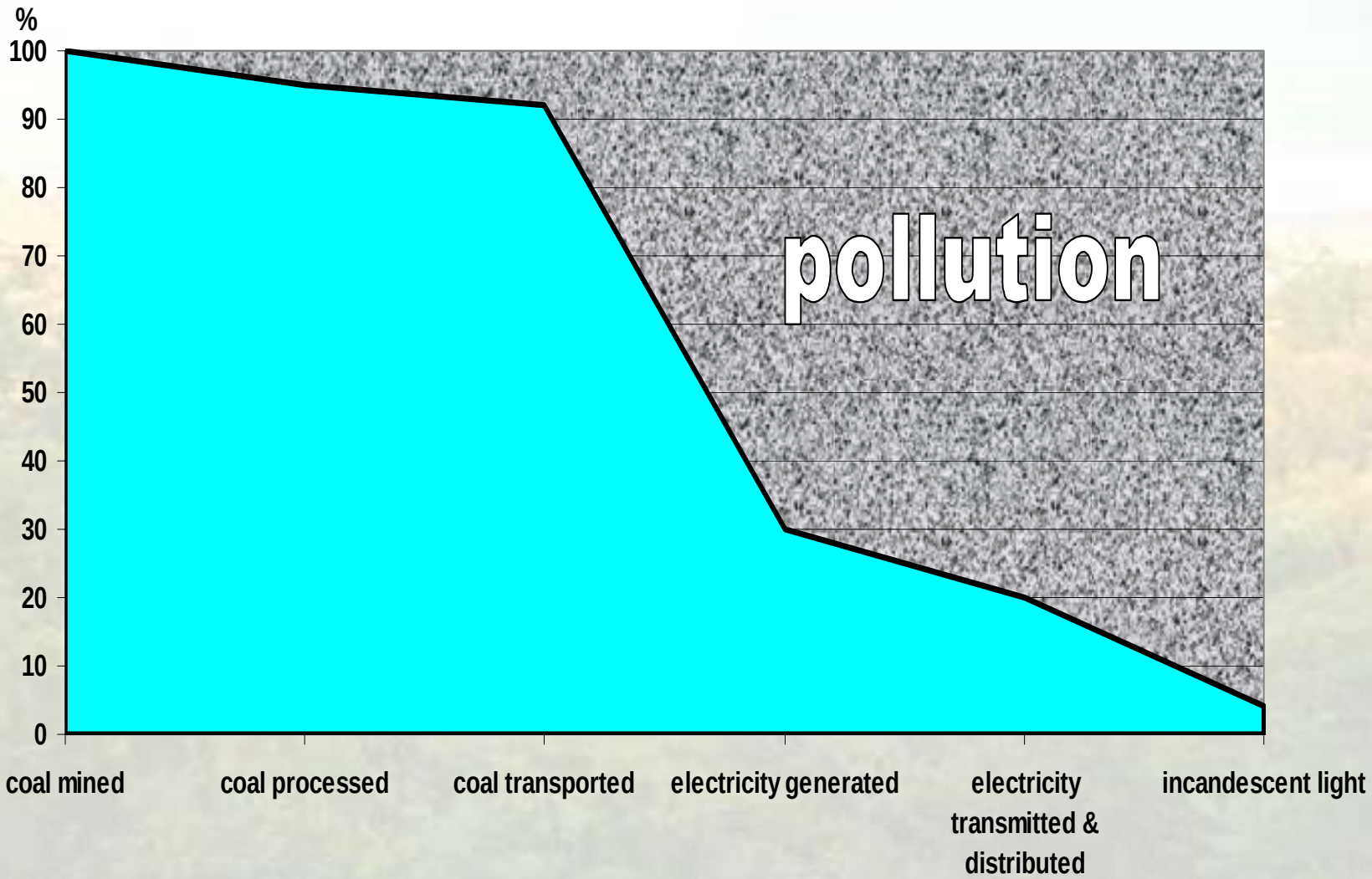


Energy intensity

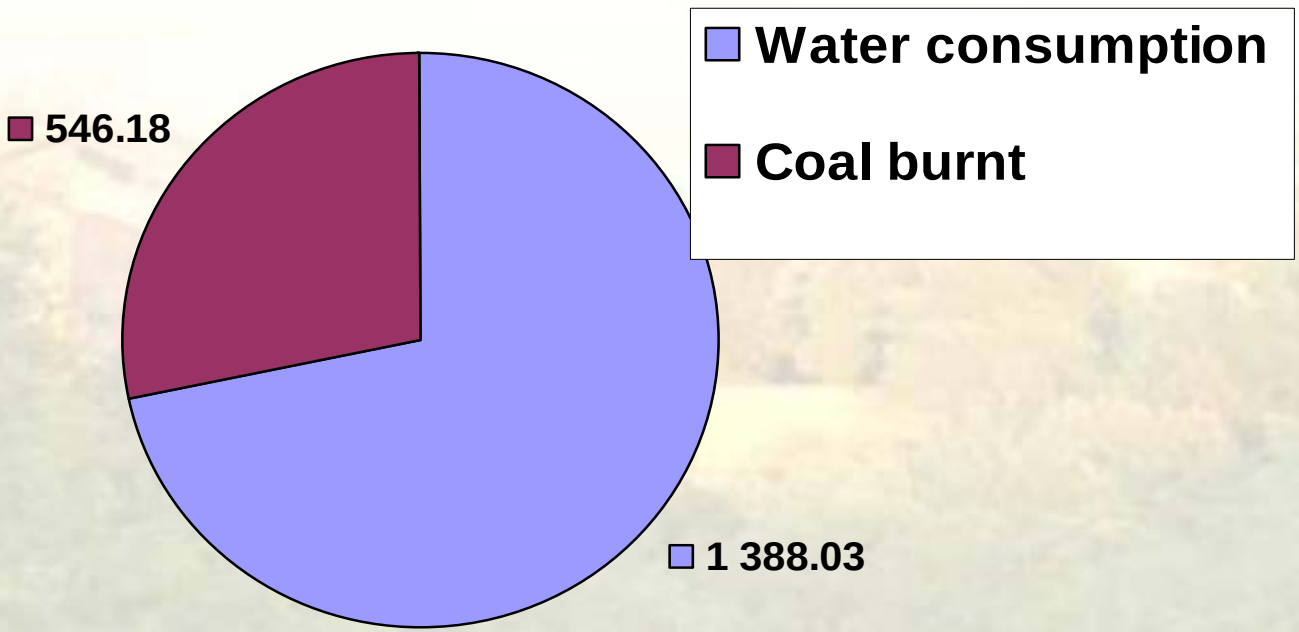



Externality costs (van Horen, 1996)
%
200
150
100
50
0
externality cost
Eskom tariff
19.5
68.9
105.3
100
100
100
low estimate
central estimate
high estimate

Typical SA energy conversion: coal to light



Consumption of coal & water (tons/MWh)



Africa has 95% of the world's best winter sunshine

SADC = 59%

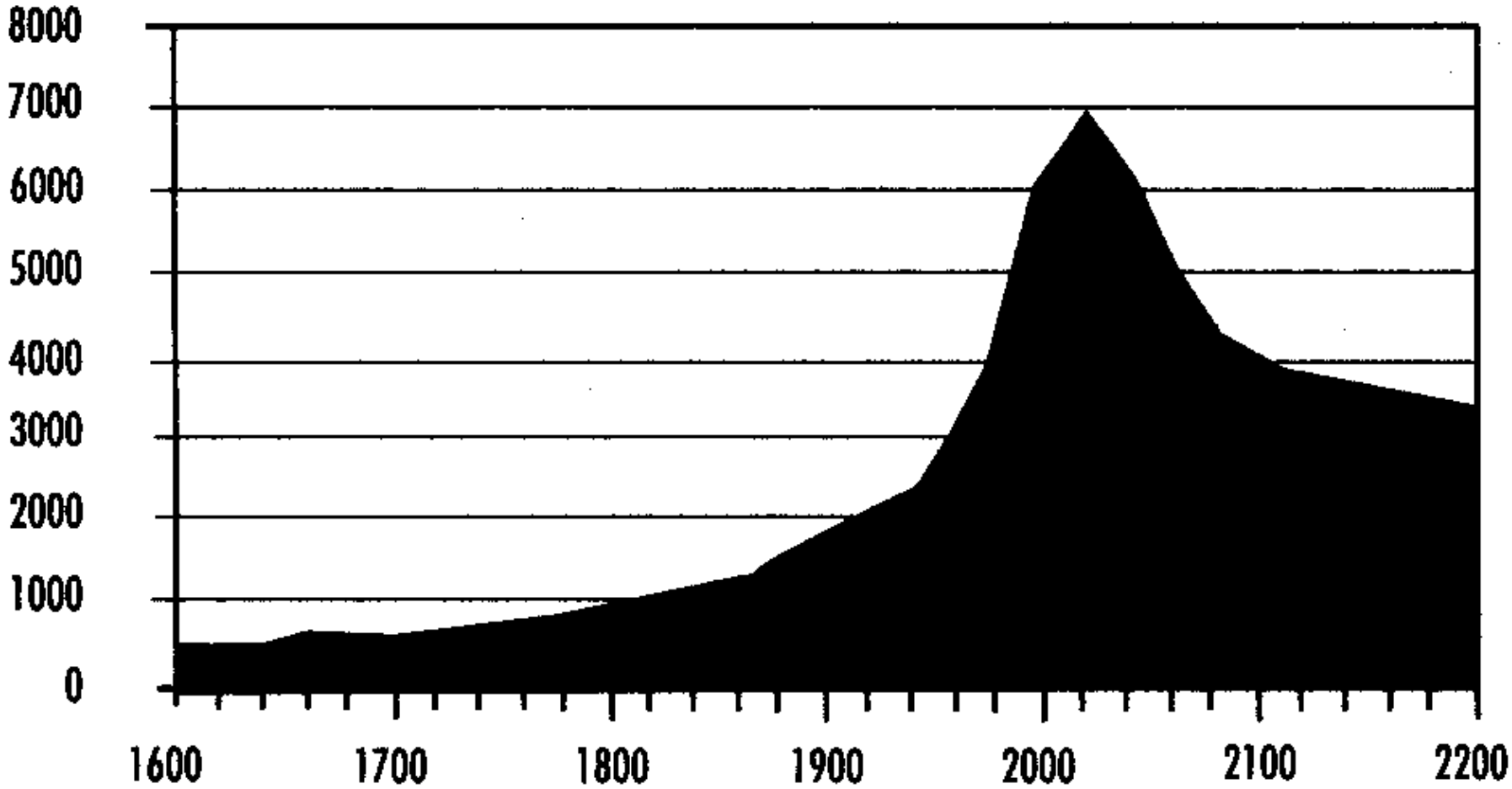
SA = 24%

Source: Solarex 1992

2. Stakeholder involvement, public buy-in/ownership

- **Switch off lights to become “cleverder”?**
- **Curse Eskom in the dark?**
- **Emigrate?**
- **Do something?**
- **Buy generator?**

Peak oil (Heinberg)



Oil Discoveries

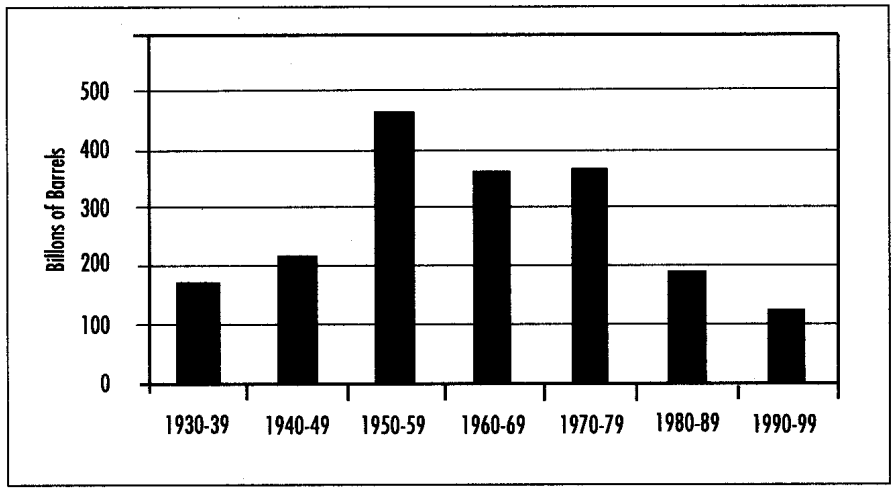
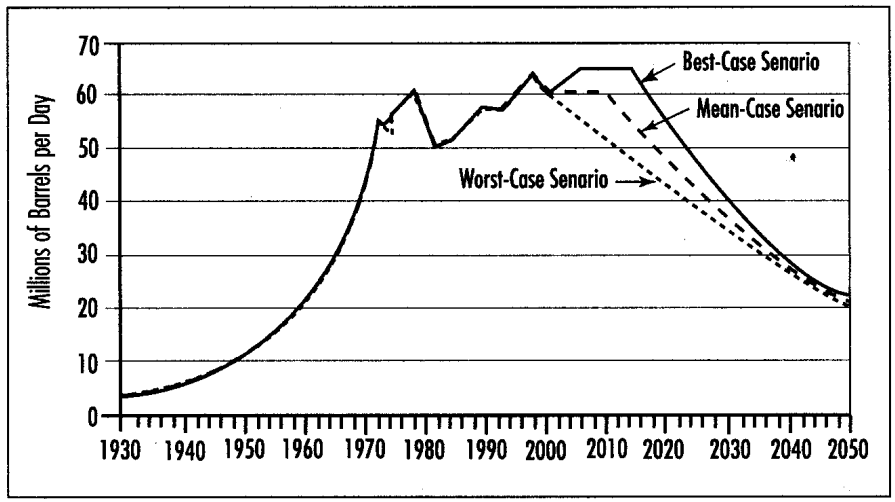
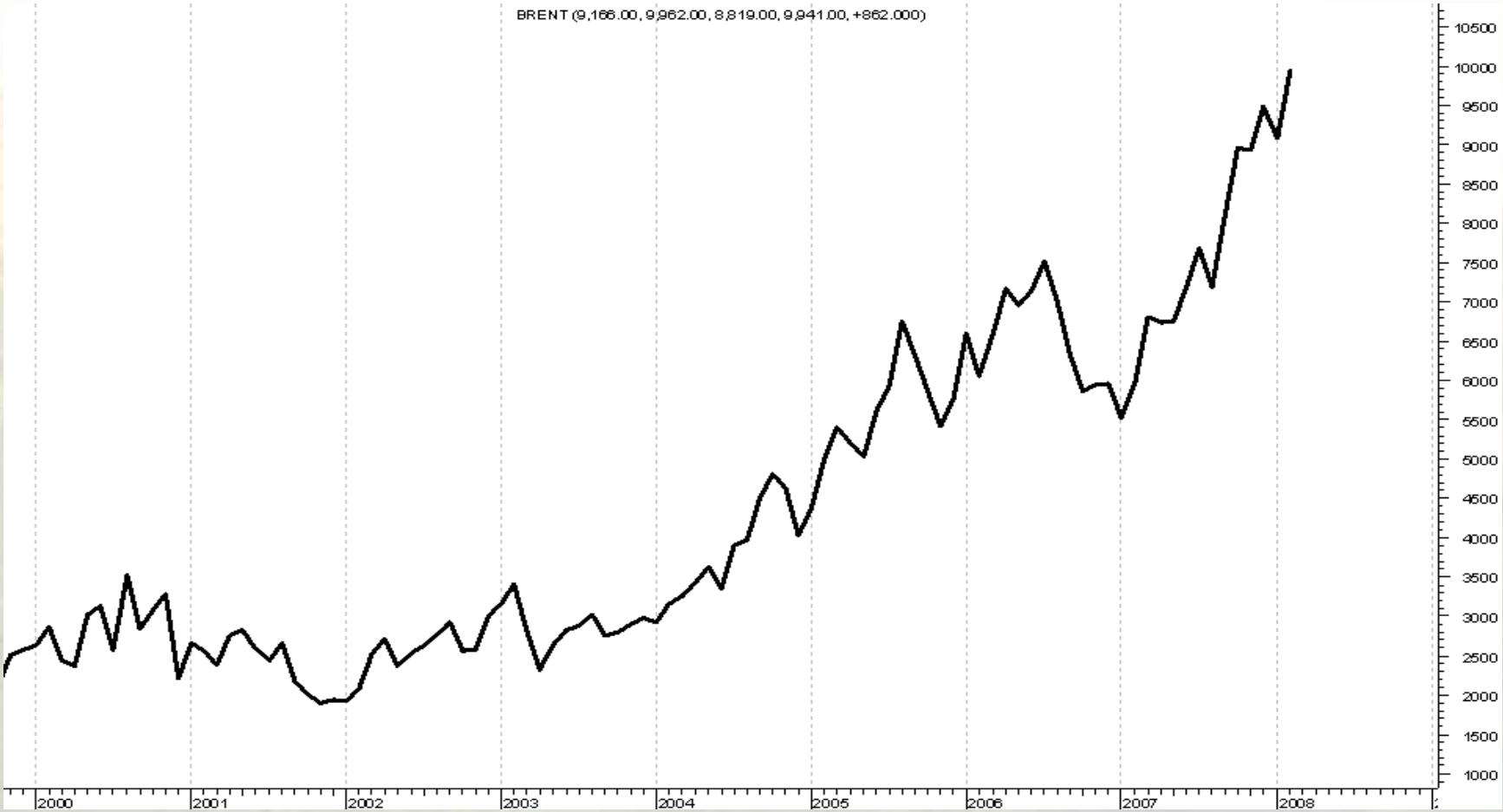


Figure 13. Oil discoveries by decade, in billions of barrels (Source: C. J. Campbell)

Peak Oil



Brent oil price

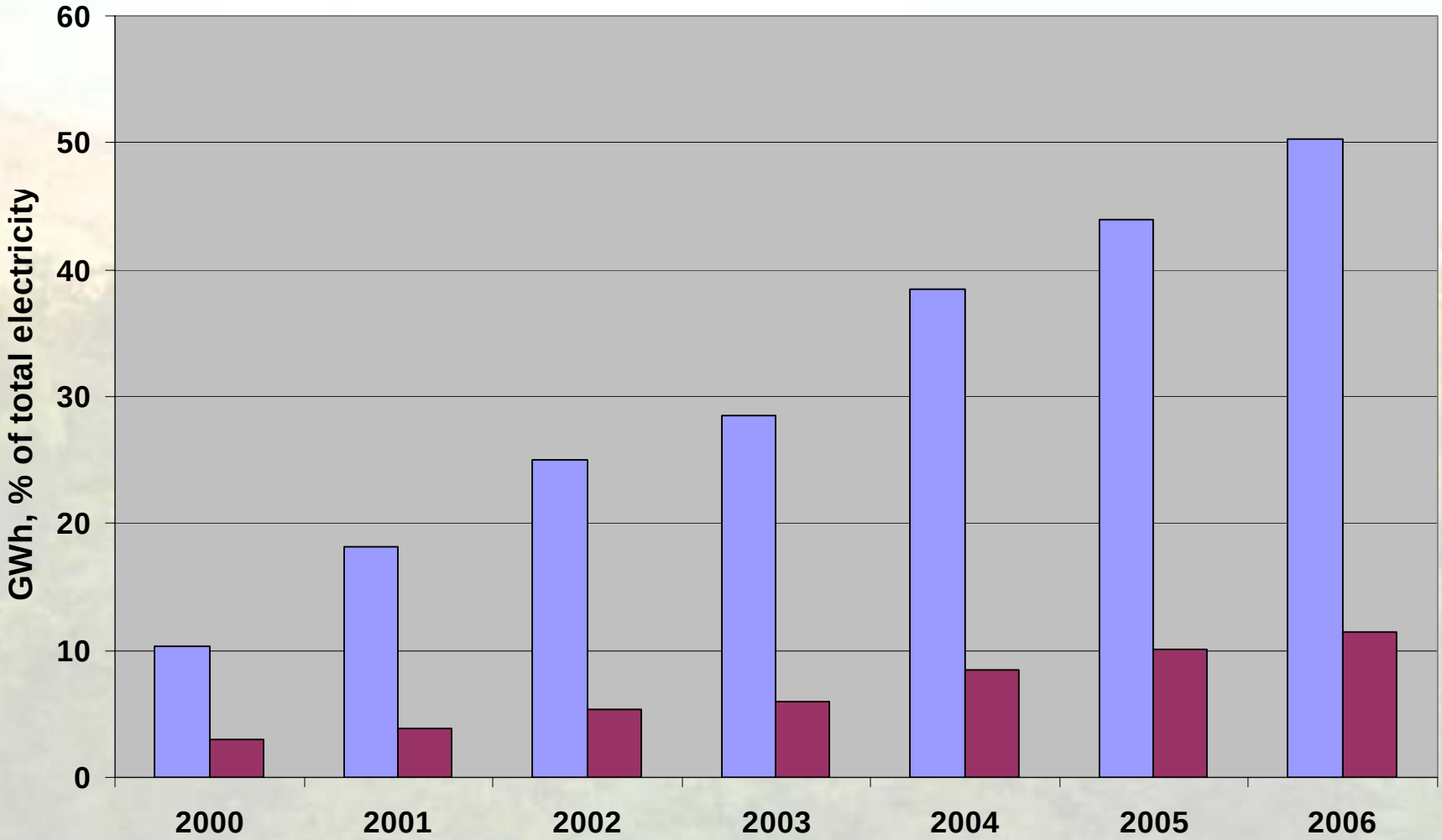


3. Legislation & regulation

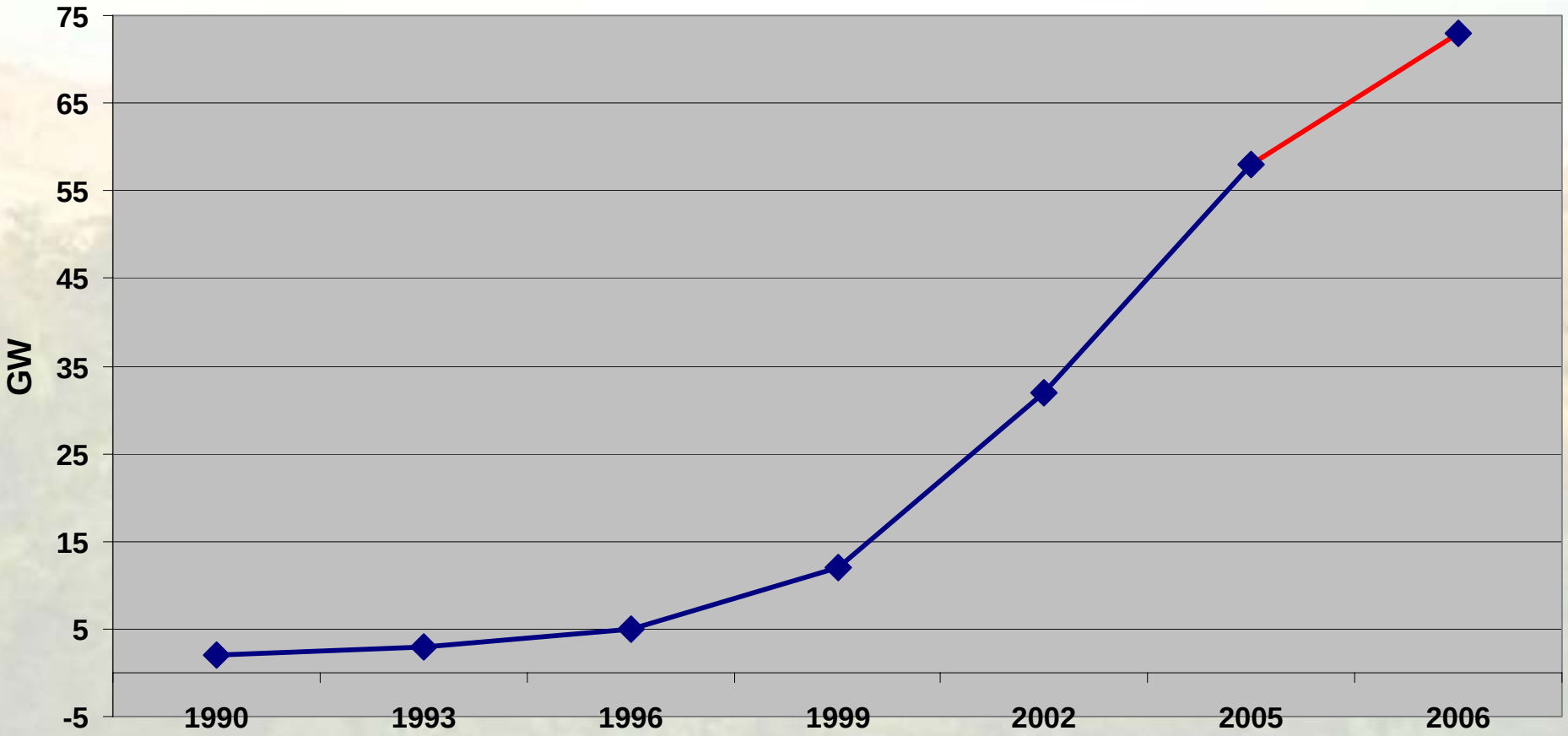
- **Barcelona ordinance**
- **RE Feed-In-Tariff – FIT (write to: M Tsikata: Mandla.Tsikata@nersa.org.za)**

& N Magubane: Nelisiwe.Magubane@dme.org.za)

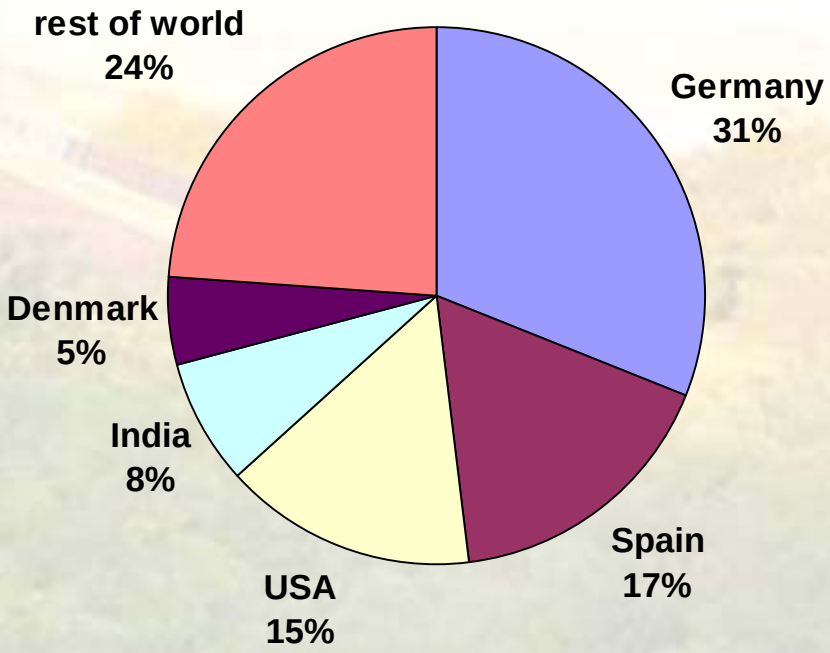
RE electricity in Germany



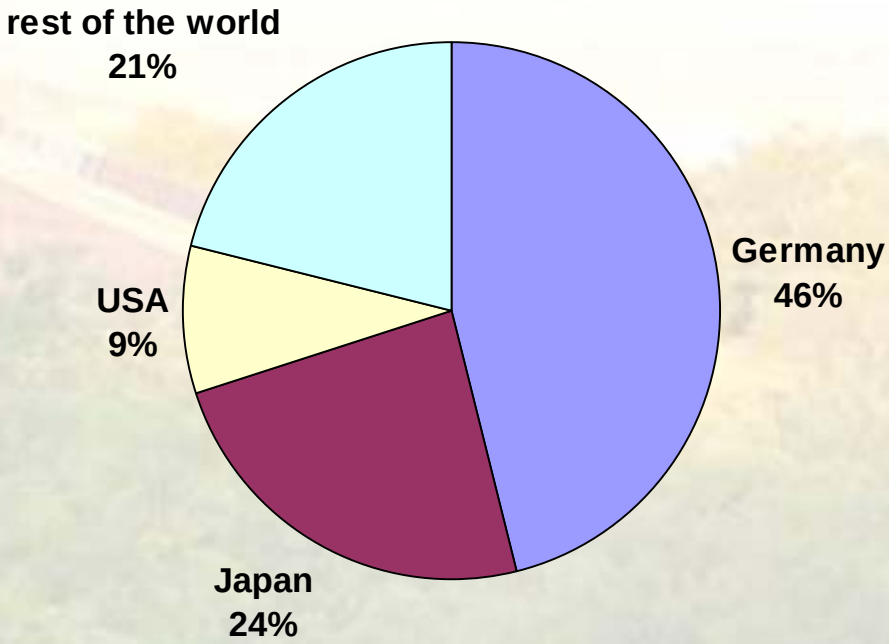
Global capacity growth in wind



Installed global wind capacity 2006



Percentage of installed PV capacity 2006 (1,45GW)

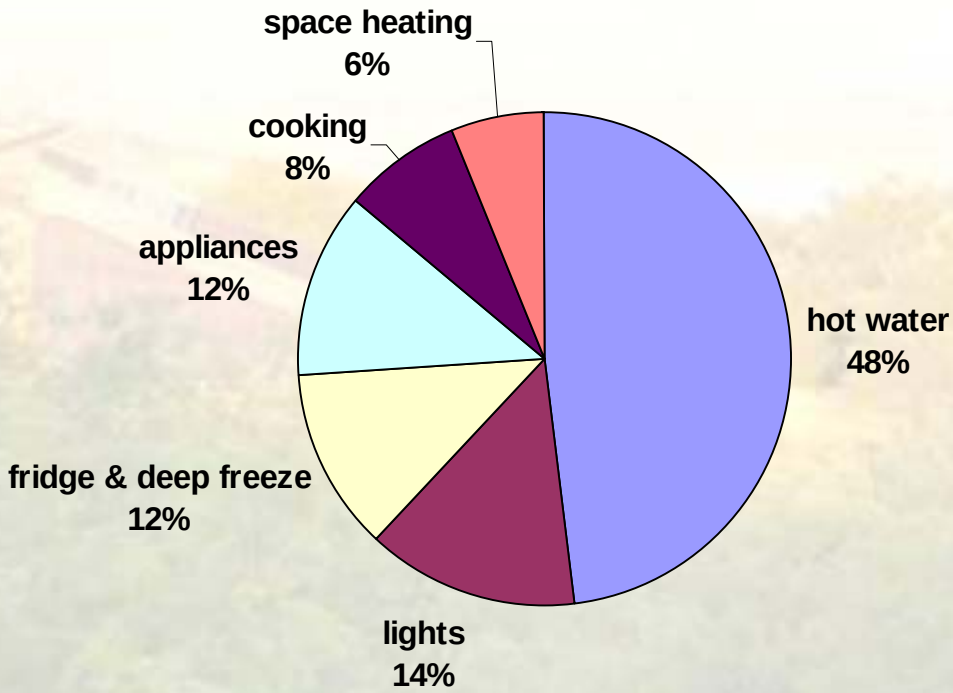


4. Industry standards, planning permits & building regulations

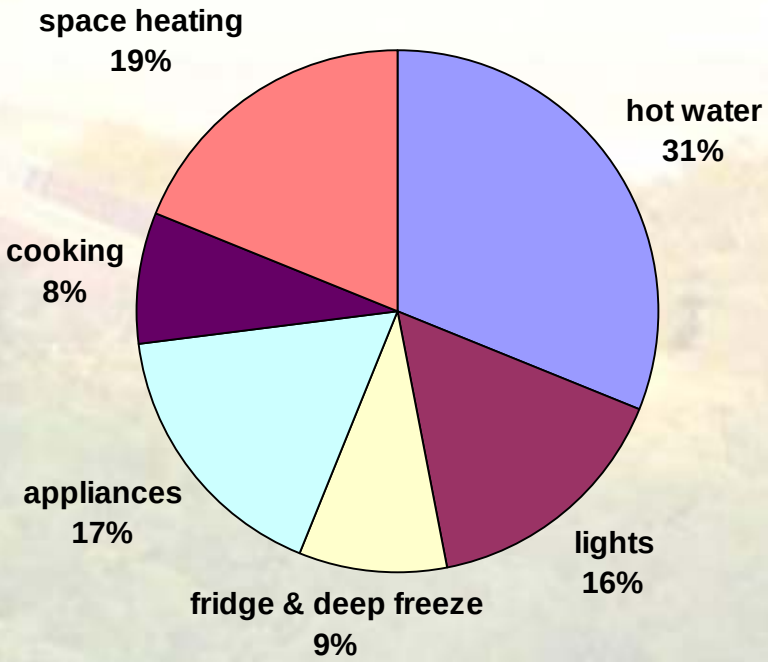
- **New technologies demand new regulations and different Environmental Impact Assessments (EIAs)**
- **Buildings globally account for 40% of energy use: “It’s the Architecture, Stupid!” (E. Mazria)**
- **Eventually: buildings as energy producers**
- **Building regs aimed at peak demand & energy reduction, EE & RE, energy diversity. Environmental protection: global warming**

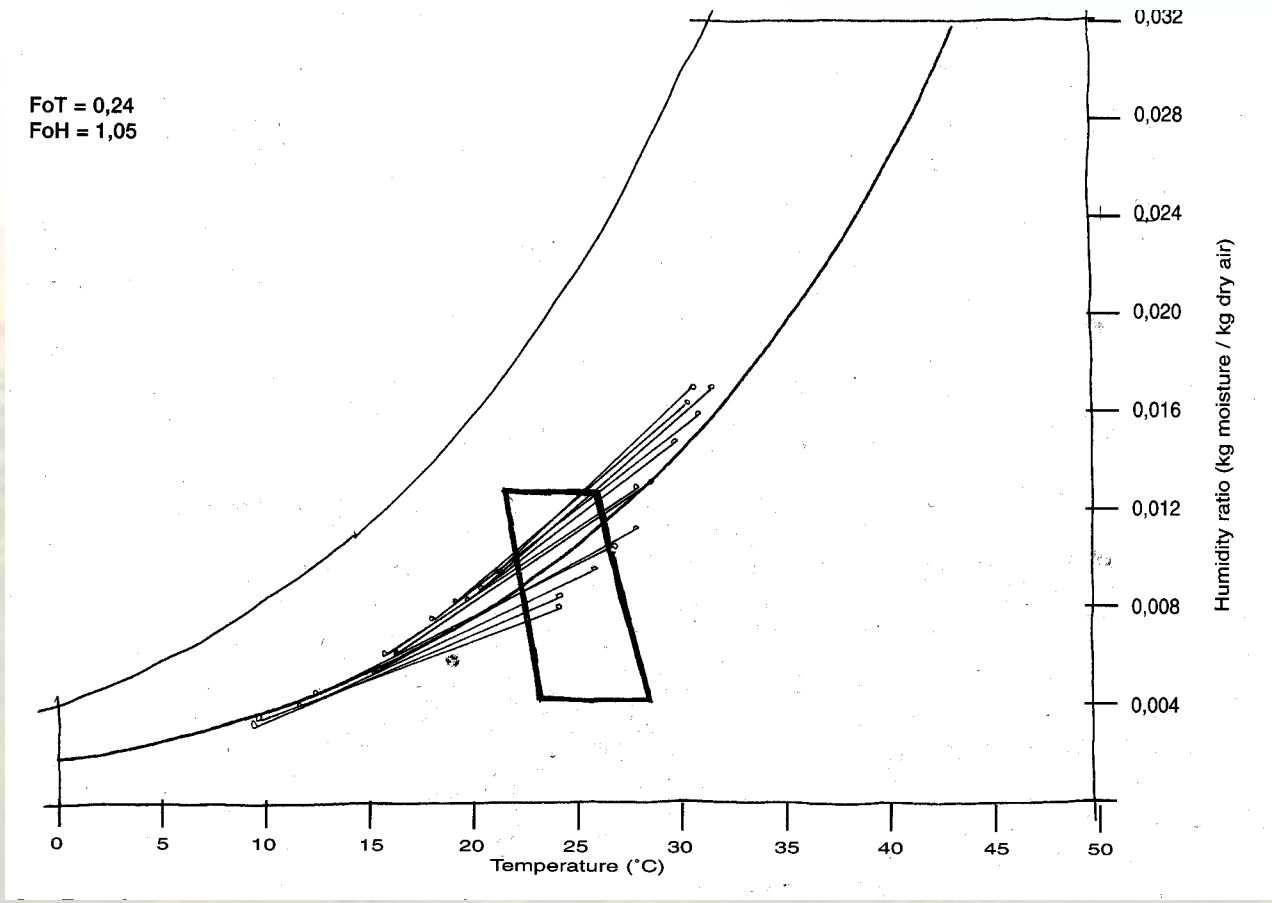

Positive proof of global warming.
18th Century
1900
1950
1970
1980
1990

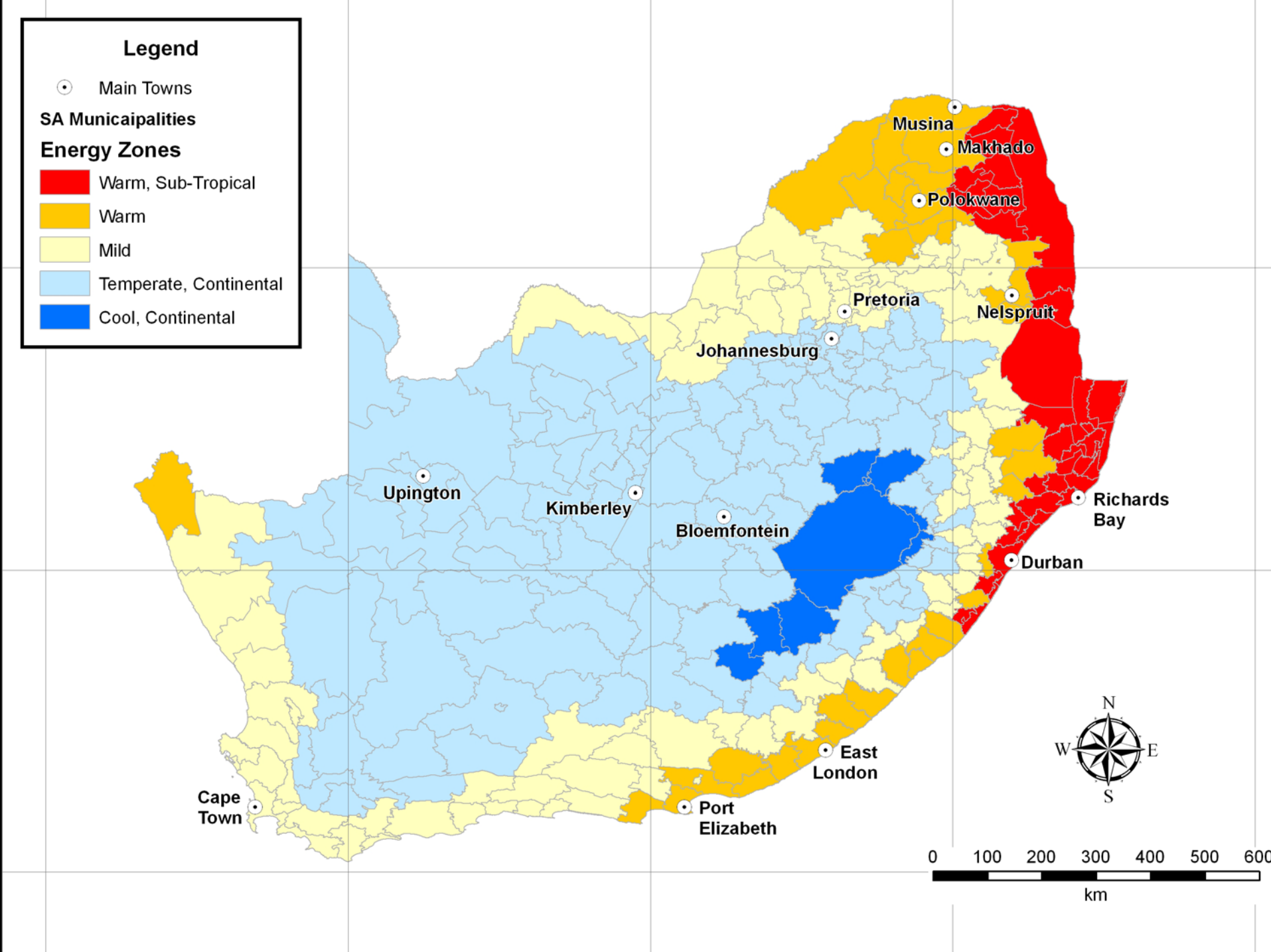
Energy consumption in suburban house



peak demand in suburban house




FoT = 0,24
FoH = 1,05
0,032
0,028
0,024
0,020
0,016
0,012
0,008
0,004
Humidity ratio (kg moisture / kg dry air)
0
5
10
15
20
25
30
35
40
45
50
Temperature (°C)


Legend
Main Towns
SA Municaipalities
Energy Zones
Warm, Sub-Tropical
Warm
Mild
Temperate, Continental
Cool, Continental
Musina
Makhado
Polokwane
Pretoria
Nelspruit
Johannesburg
Upington
Kimberley
Bloemfontein
Richards Bay
Durban
East London
Port Elizabeth
Cape Town
N
W
E
S
0
100
200
300
400
500
600
km

Straw bale house

architect & owner:Christiaan van Zyl

5. Financial interventions & incentives

- **Increase EE & RE RD&D by a factor of ten (Renewables 2004, Bonn, Germany)**
- **Financially reward RE production, not inefficient generation**
- **Incentives for resource mapping suitable for pre-feasibility studies**
- **Increase carbon tax: clear signal**

Competitiveness rating

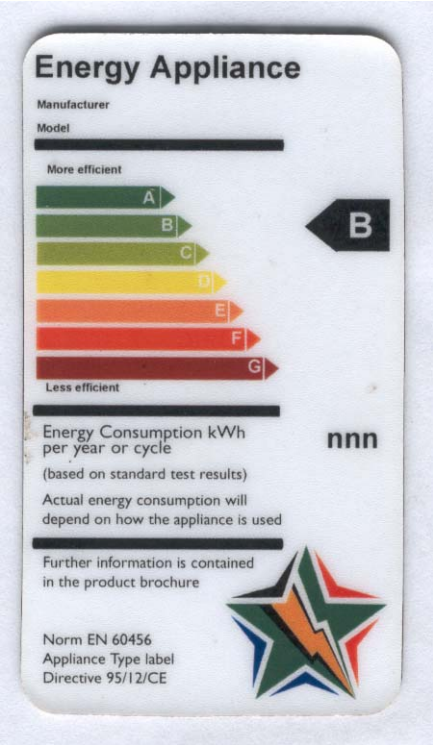
world

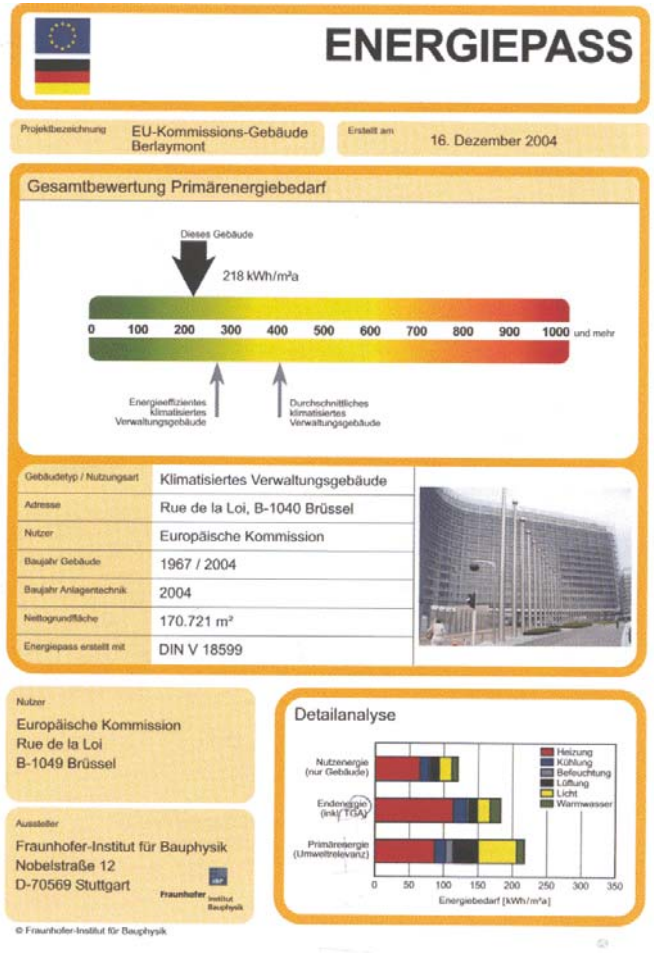
Zimbabwe 58/58

SA 47/58

South Africa ranks in position number 7 out of 24 in Africa

Energy Appliance Labelling





Summary

- **Old paradigm:**
- **Single, centralised monopoly power supply based on finite & polluting resources**
- **Cheap energy prices produce international competitiveness**
- **New paradigm:**
- **Multiple stakeholders, distributed generation based on sustainable, renewable & non-polluting energy sources**
- **Energy efficiency & renewable energy foster international competitiveness, surety of supply & sustainable development**

Work for all of us!

QUESTIONS?