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If not nuclear, then what?

Leila Mahomed

Sustainable Energy Africa

Association incorporated under Section 21

- A not-for-profit, public benefit organisation, since 2000
- SEA promotes sustainable energy approaches and practices in the development of South Africa and Africa.
- We do this through research, capacity building, information dissemination, project implementation, lobbying and networking.
- Staff include engineers, energy policy graduates, environmentalists, economists

Outline of presentation

- Challenges facing South Africans today
- What sort of energy system do we want in South Africa
- Does nuclear fit the bill?
- What fits these objectives? The case for sustainable energy
- Take home message: Summary
- Our call to you

Challenges facing the people of South Africa today

- Poverty
- Lack of jobs
- Increasing inequity
- Exponential increase in prices of basic goods & services
- Poor health
- Safety & security

What do we want from our energy system in SA?

- Energy security
- Efficient & Reliable
- An energy system that does not harm our health and our grandchildrens health
- Or our environment, now and when we no longer here
- That creates jobs
- That meets the needs of people
- That is cost effective
- …into the future

Does nuclear fit the bill?

- Safety risk & significant consequences
- PBMR No financing mechanism/ no investors
- Environmental pollution/ waste & health risk
- Employment decrease or small number of high skilled jobs

NO!

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VIES 15°

MONDAY, JUNE 18, 2007 See Page 24

ESKOM TOLD TO HALT PROJECT

Safety fears put brakes on nuclear programme

MELANIE GOSLING
Environment Writer

THE National Nuclear Regulator (NNR), the body responsible for nuclear safety, has slammed the brakes on Eskom's planned pebble bed modular reactor (PBMR).

This is because of problems with the manufacture of safety equipment.

The suspension of the manufacture of safety-related components came in October and remains in force.

It is to be removed when Eskom and the PBMR (Pty) Ltd have provided the NNR with documentation to show that the manufacturing process meets the regulator's quality requirements and that they have taken "corrective action" in their approach to the licensing of the pebble bed reactor.

The Cape Times became aware of the suspension through an article in the Platt's international journal, Nucleonics Week, published on June 7. Platt's is an international energy information company.

An official at the NNR, who did not want to be named, has confirmed that the contents of the article are correct.

Ann MacLachlan, who wrote the article, said the NNR and Eskom had not disclosed the order to stop work. The NNR had confirmed it after Nucleonics Week made inquiries.

The article says the NNR issued a directive to Eskom, as the pebble bed's licensee, to suspend "all manufacturing activities related to important-to-safety components".

It quotes NNR's programme manager for PBMR licensing, Peter Bester, who said the order to stop work on safety-related components had been issued after the NNR had learnt that manufacturing activities for some of these had started "without the necessary regulatory control. As a result, the NNR was unable to perform its regulatory function over the process" as mandated by law.

The NNR was established under the National Nuclear Act of 1999 for the protection of the public, property and the environment against nuclear damage.

Nucleonics Week quotes an Eskom official, who did not want to be identified, as saying he was unable to predict when the documents would be given to the NNR and that it was up to the PBMR company to provide the technical details.

Jaco Kriek, chief executive officer of PBMR (Pty) Ltd, told Nucleonics Week that it would be "inappropriate for PBMR to comment" on the stop-work order. He referred questions to Eskom, as the licensee.

Eskom holds 100% of the PBMR company, a subsidiary.

The article quotes PBMR's technical manager, Gert Claasen, who said at an international nuclear congress in France earlier this year that the demo PBMR was unlikely to be operating before 2012 because of licensing snags.

Claasen said it was proving "very difficult to get through the regulatory process with a

To Page 3

Then what….

So what fits these objectives of what people want and what energy system we need?

- The case for Sustainable Energy
- The appropriate alternative for South Africa

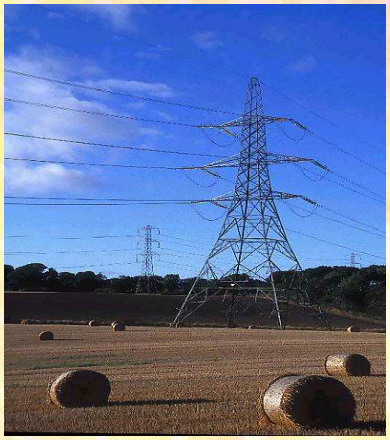
What is sustainable energy?

Energy which has the least impact on the environment, having three components:

1
Reduce demand

2
Generation from renewables

3
Maximise delivery efficiency & storage



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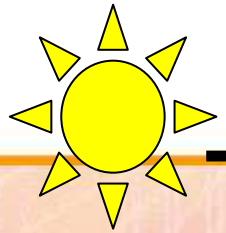
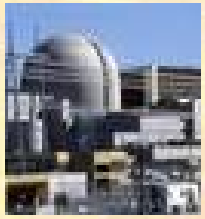
Energy Sources – RE in perspective



Renewable Energy



Biomass

- Biomass Co-Generation
- Bio-Gas
- Bio-Diesel
- Bio-Ethanol
- Wood

Solar

- Solar PV
- Solar Water Heating
- Solar Thermal Generation
- Passive Solar Architecture

Wind

- Wind Turbines
- Wind driven water pumps

Water

- Hydro
- Mini Hydro
- Waves
- Tides & Currents

Nuclear

- Uranium

Fossil Fuels

- Oil
- Coal
- Gas

finite finite

41 years

50 years
200 years
50 years

+- Every Day/infinite

http://www.talkorigins.org/faqs/faq-age-of-earth.html

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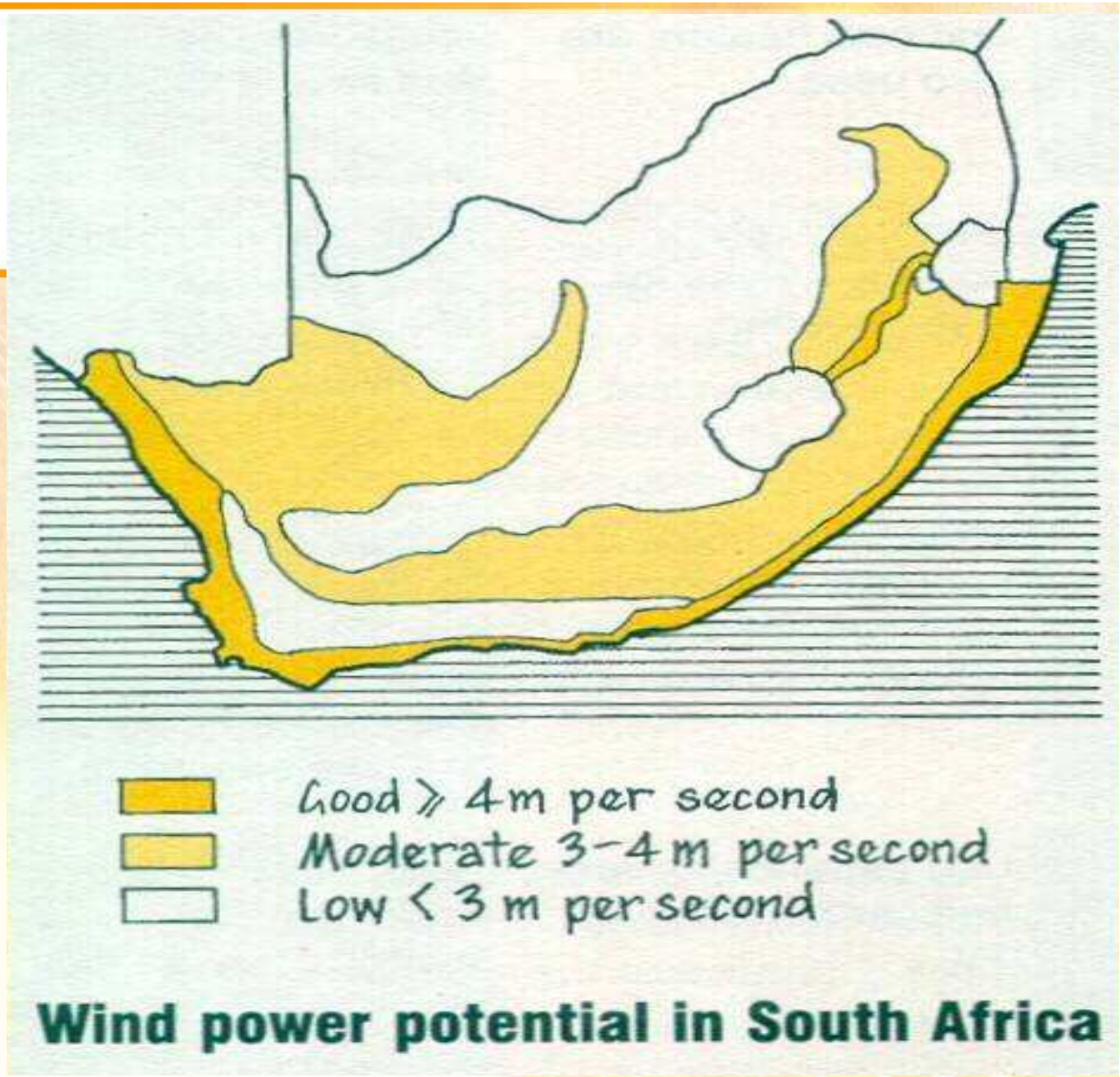
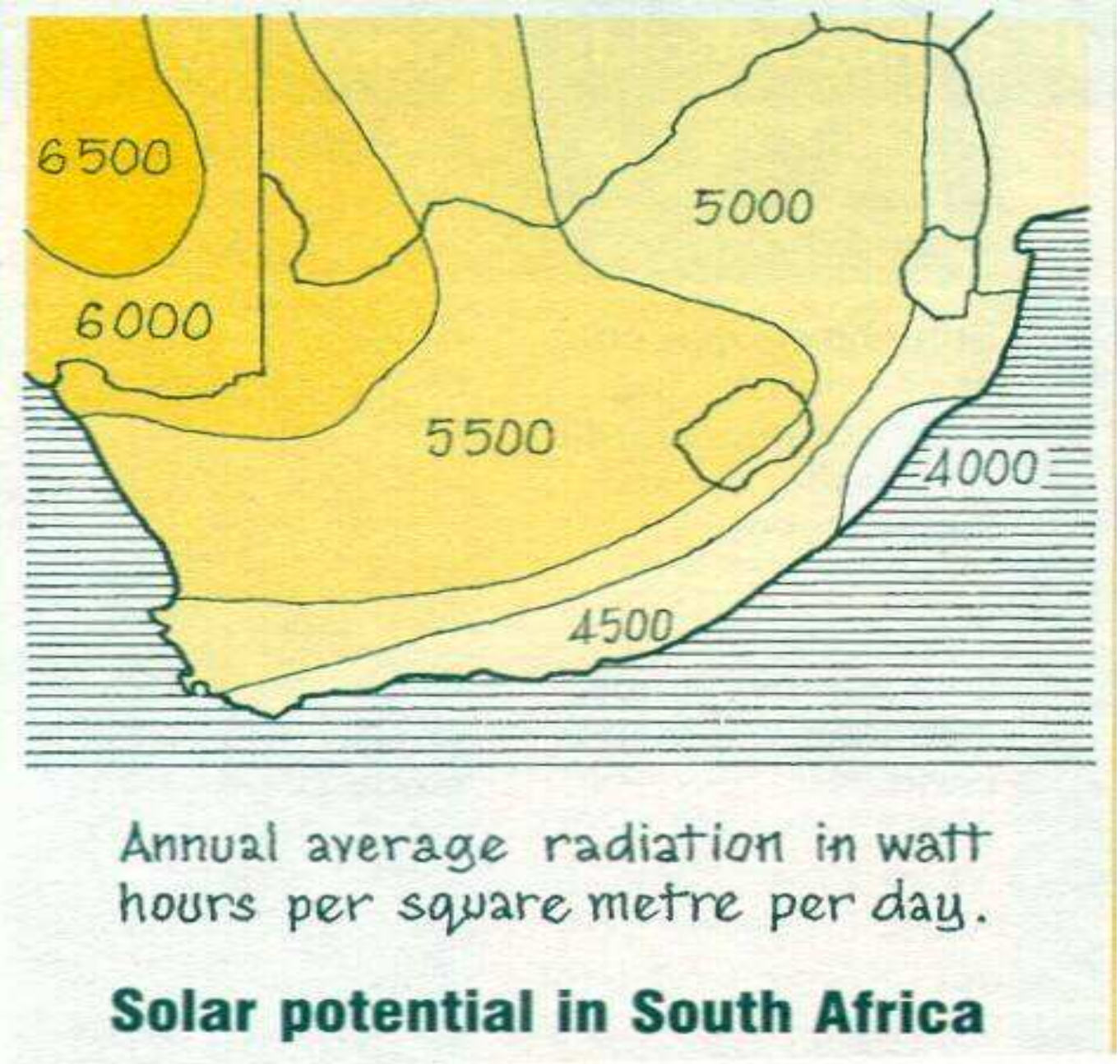
Renewable Resources in SA

- Wind
- Solar
- Biomass
- Small-scale hydro
- Wave
- Ocean currents
- Waste

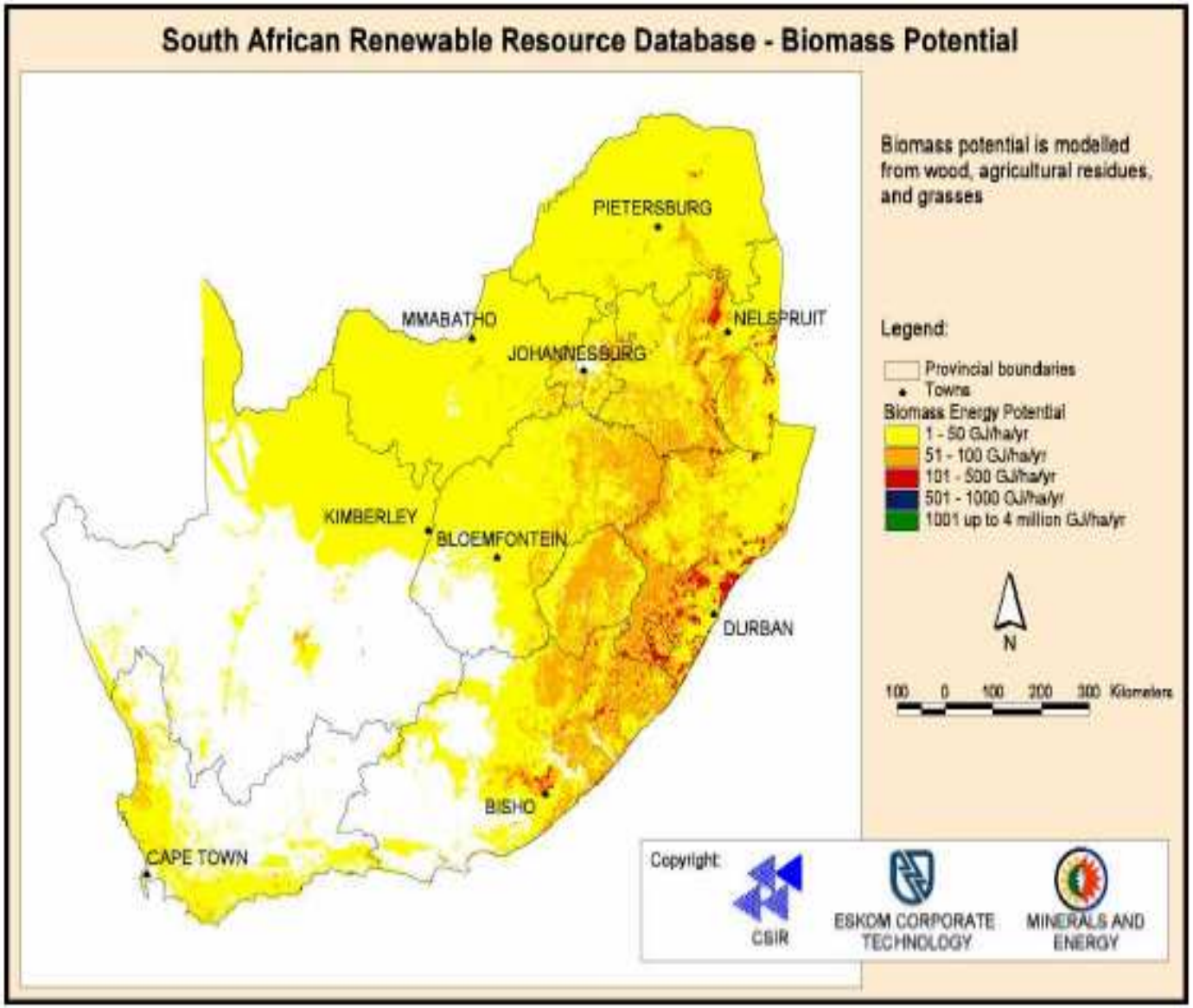
- Wind
  - Potential mainly around coast (3 GW potential estimated)



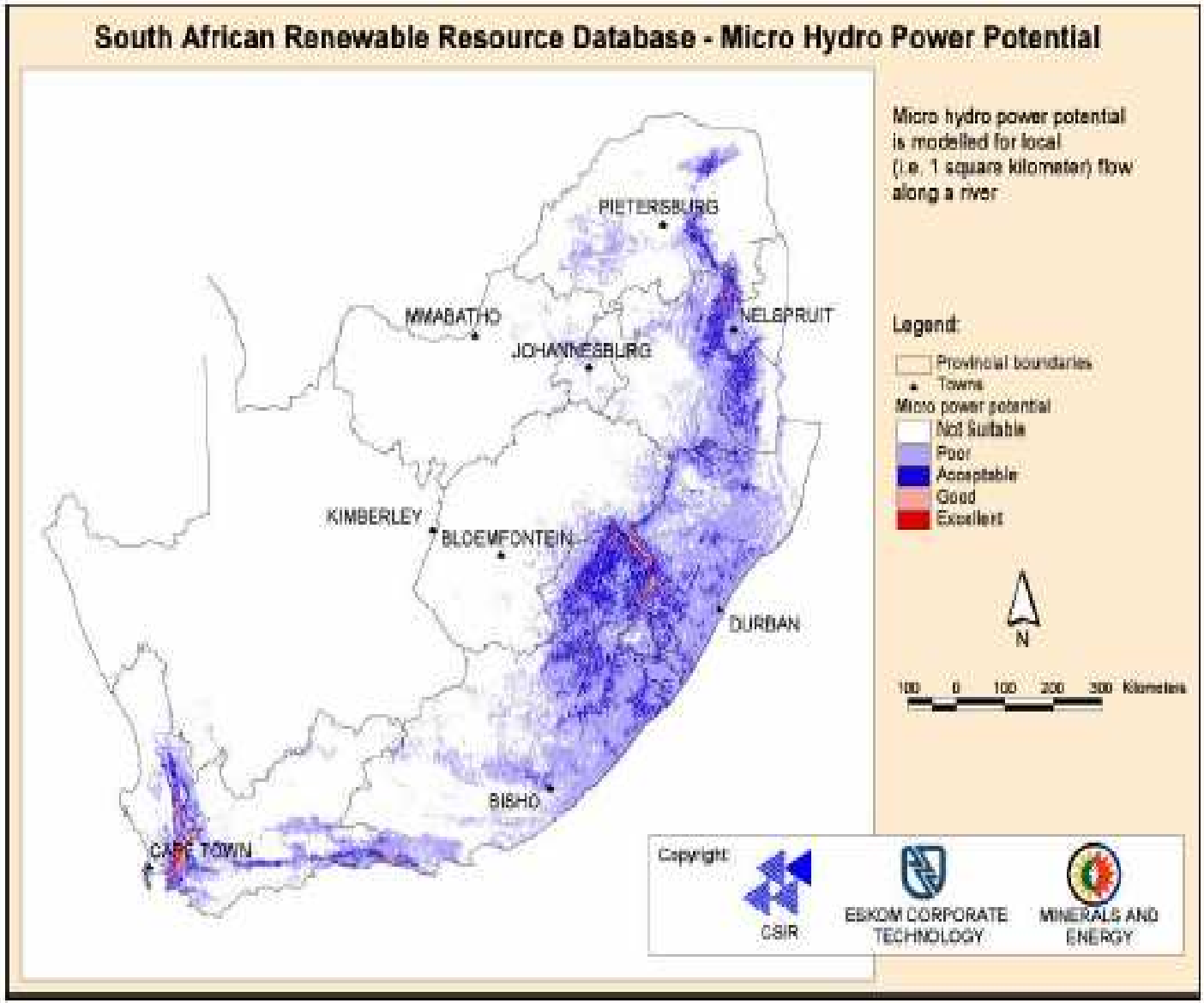
- Solar
  - Huge resource - radiation levels very good by international standards



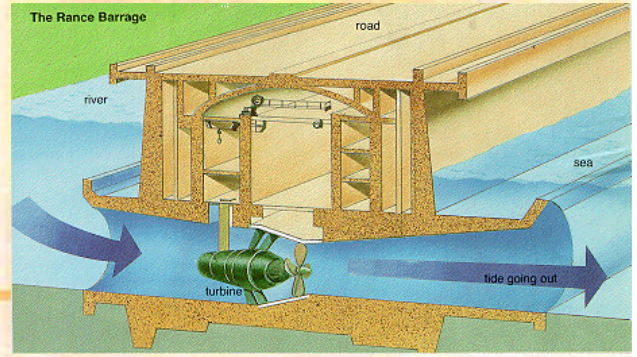
- Biomass
  - Bagasse
  - Domestic firewood
  - Pulp & paper waste
  - Biofuels



- Micro-hydro
  - Potential not great (water scarce country)
  - Viability is site specific



- Ocean energy
  - Wave energy (40kW/meter of wave crest p.a.)
    - Costs appear to be prohibitive
    - Prototypes user investigation
  - Ocean currents
    - One of fastest currents in the world (6m/sec)
    - 2000 MW potential
    - Prototypes being tested
- Waste
  - Landfill gas – large potential
  - Sewage methane – significant potential



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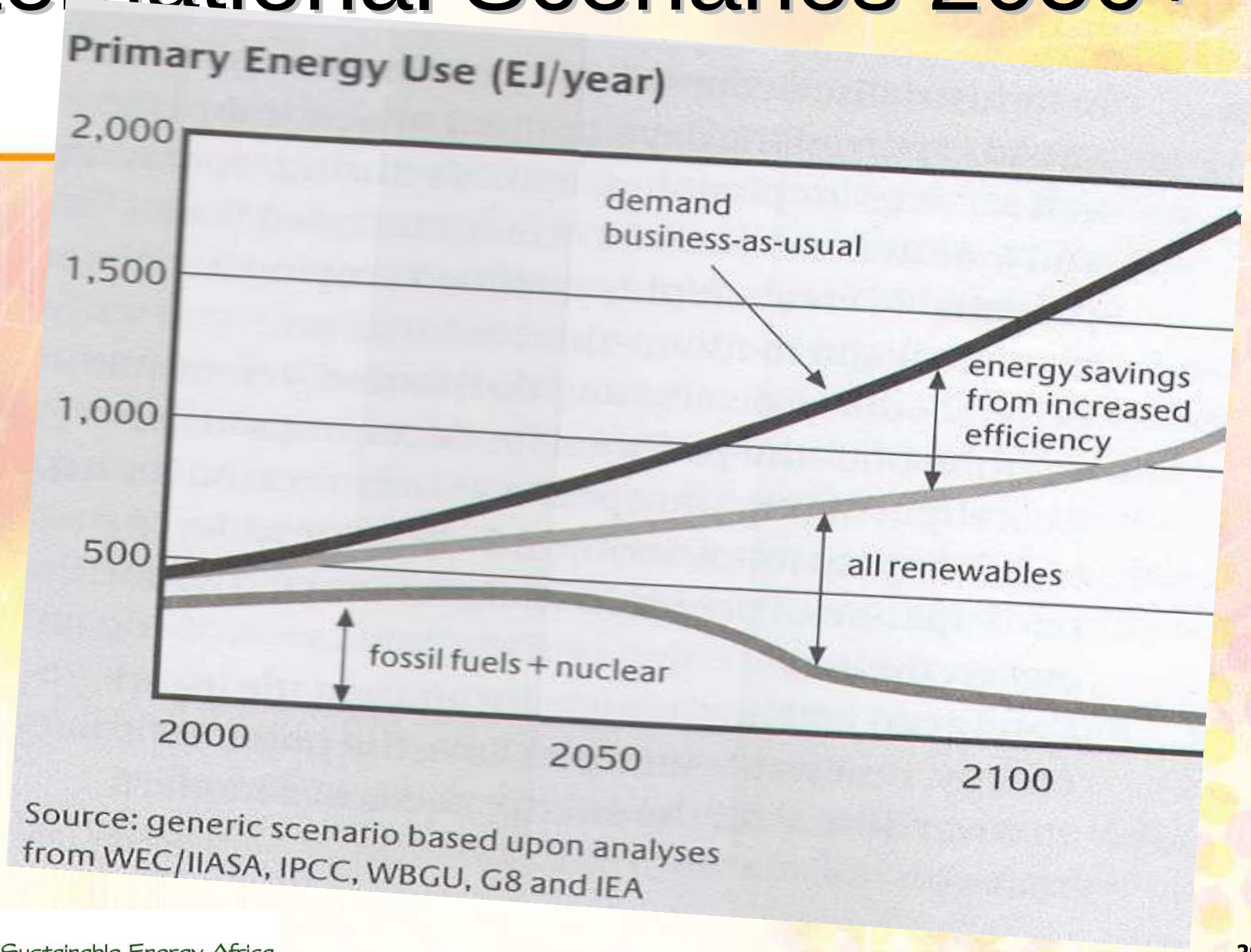
International Renewables resources

1.1 Technical Potential[a] for Renewable Energies (Exajoules)

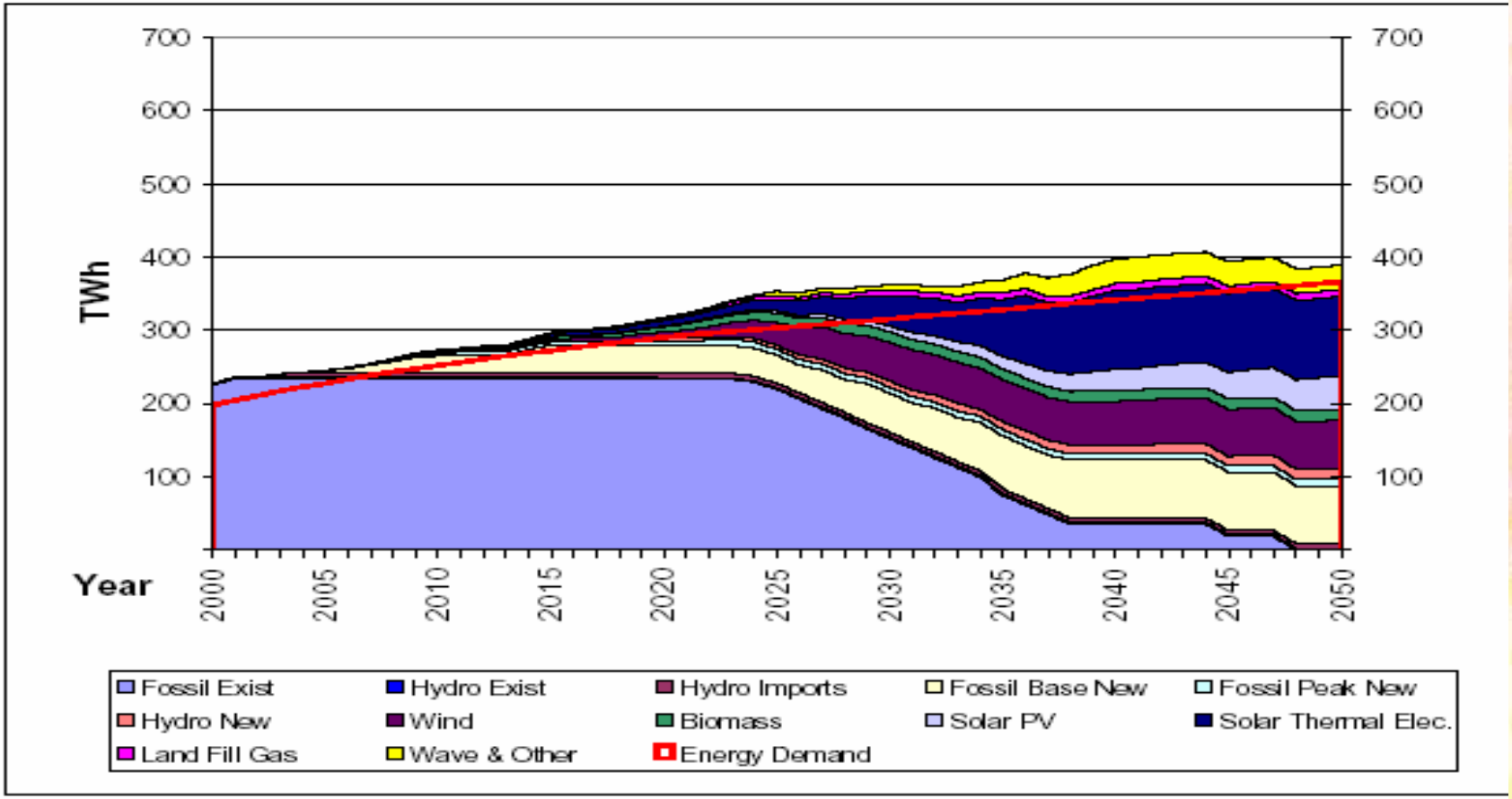
	Biomass	Hydro	Solar[a]	Wind[c]	Geothermal[b]	Ocean[c]	Total
Africa	63	7	783	91	242	-	1,186
Asia + Pacific	72	21	266	106	362	-	827
Europe	35	6	228	168	312	-	749
Latin America, Caribbean	61	10	112	64	235	-	482
North America	52	6	181	151	250	-	640
World (potentials)	283	50	1,570	580	1,401	730	4,614
Current use	50	10	0.2	0.2	2	0	62.4
Total primary energy consumption							420

International Scenarios 2050+



Renewables scenario for SA 2050

Figure S2: Progressive Renewable Scenario:
Illustration of how electricity energy demand would be met[2]



What do we need in 2050?

- **367 TWh**
- By 2050 Renewable Energy can provide:
- **267 TWh**

In order to deliver the required capacity, Eskom plans to spend R84 billion over five years

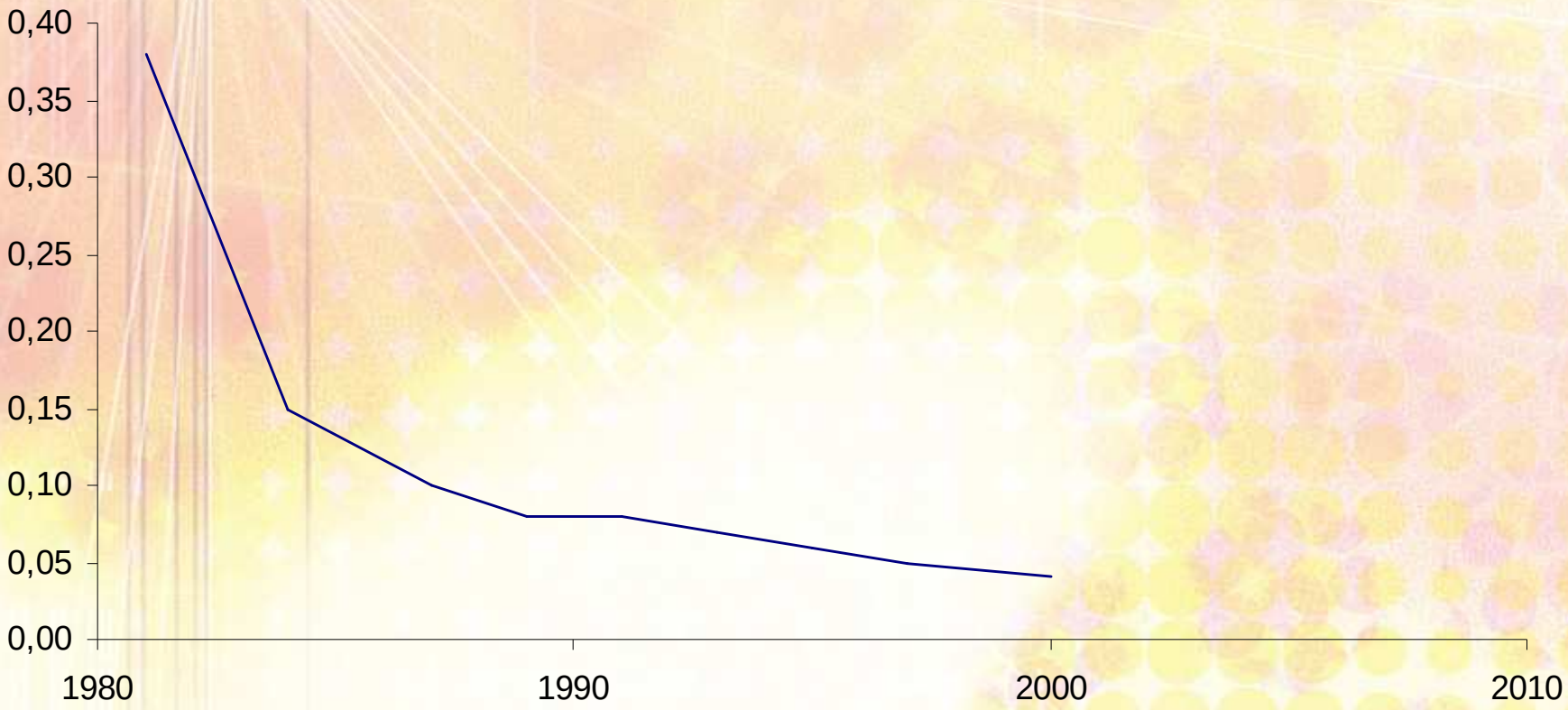
	2006/07	2007/08	2008/09	2009/10	2010/11	Total
Generation	9,825	8,323	9,598	11,894	13,442	**53,083**
Transmission	1,566	2,633	2,736	2,717	1,306	10,958
Distribution	2,935	3,257	3,052	3,037	3,131	15,412
Corporate	389	318	317	290	275	1,589
New business	34	52	317	1,065	2,116	3,584
Total R'm	**14,749**	**14,584**	**16,019**	**19,003**	**20,271**	**84,626**

Financing for the future

- Investment needed:
- “By committing a significant proportion of the required energy service infrastructure investments (10 - 20%) for EE and RE governments in less-developed countries….” REEEP

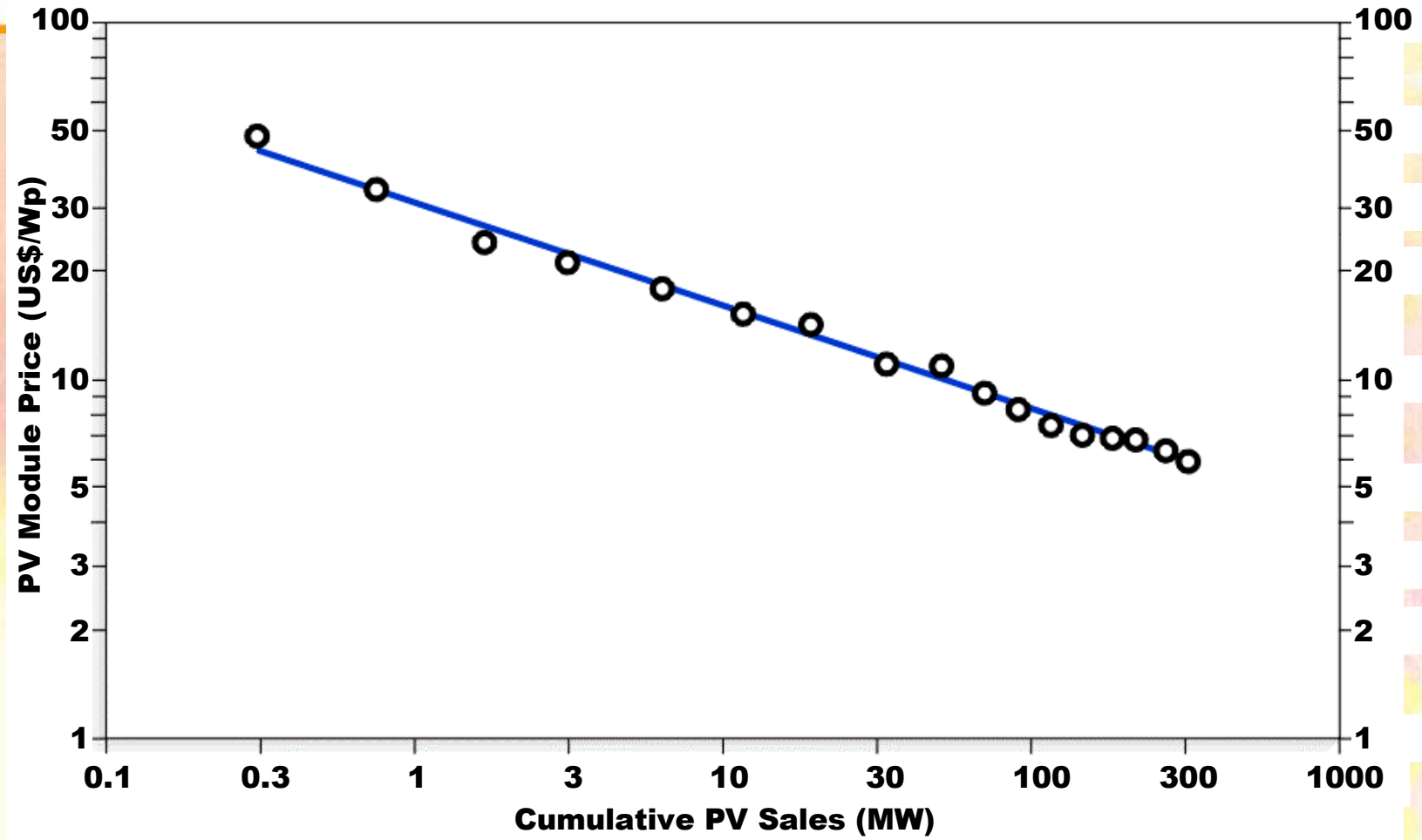
- = R5bn to R10bn of Eskoms current allocation

DECREASING COST OF WIND ENERGY



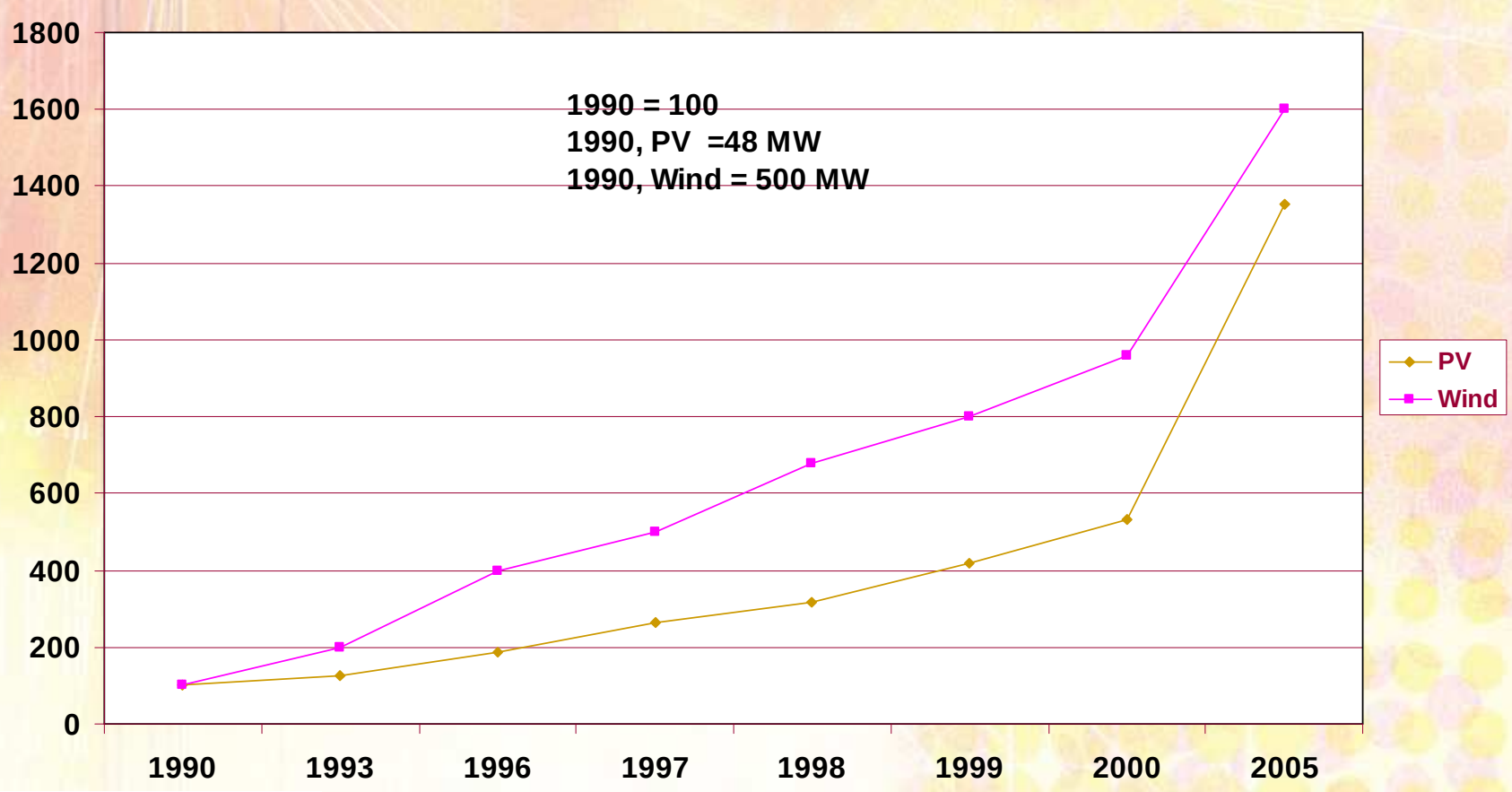
Source: American Wind Energy Association, 2000

log Plot of the Selling Price of PV Modules



In the period 1976-1992, the world-average PV module selling price declined 18.4 percent for each cumulative doubling of PV module production. Module sales data and prices are from Strategies Unlimited, Mountain View, CA.
Source: UNDP (1997).

GROWTH IN WIND AND PV MARKETS, 1990-2005



Financing for the future ..

Climate change mechanisms:

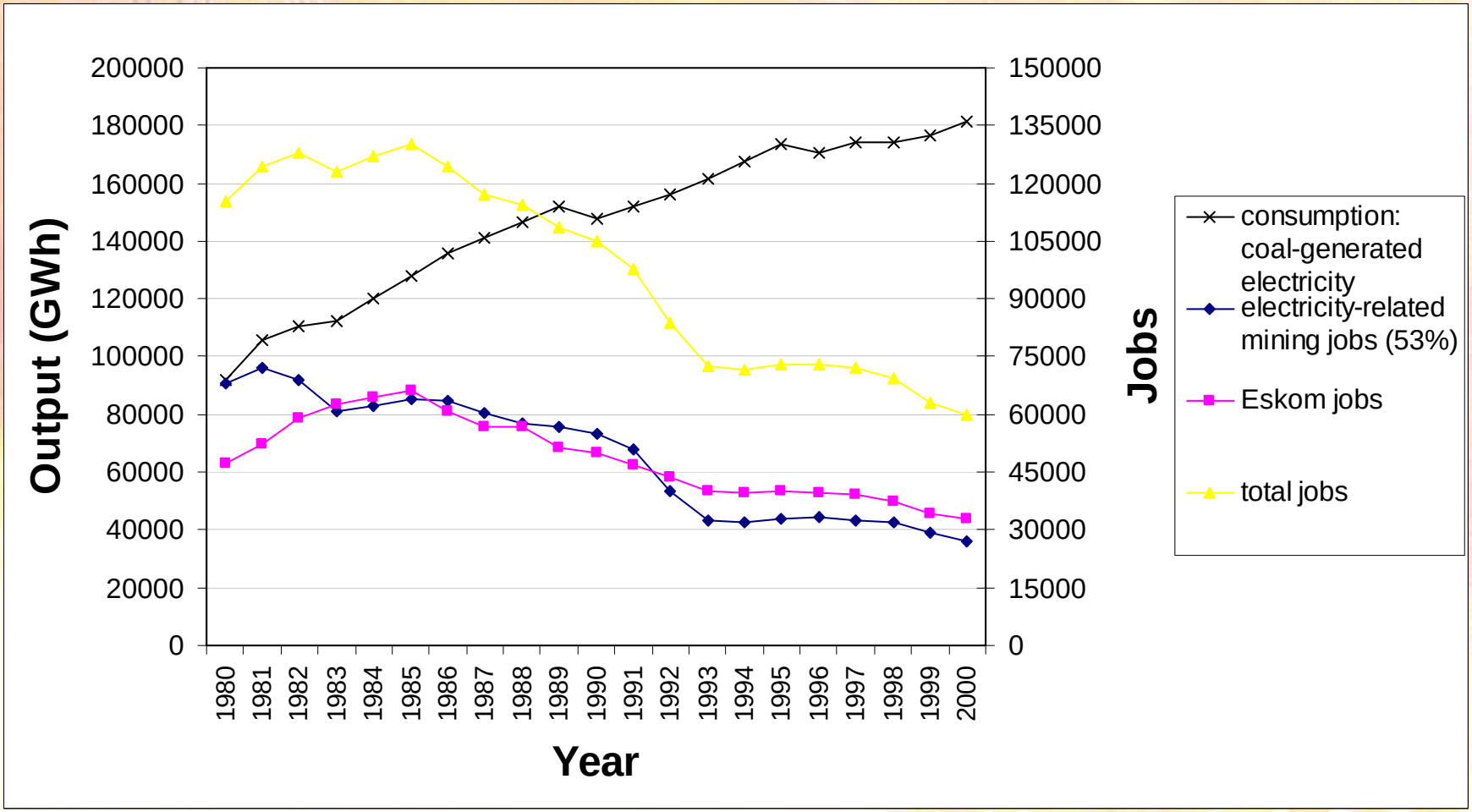
Clean Development mechanism (CDM)
= 5 – 10 euros /credit

Offset alternative
= 10 – 15 euros/credit

excludes Nuclear & fossil fuel

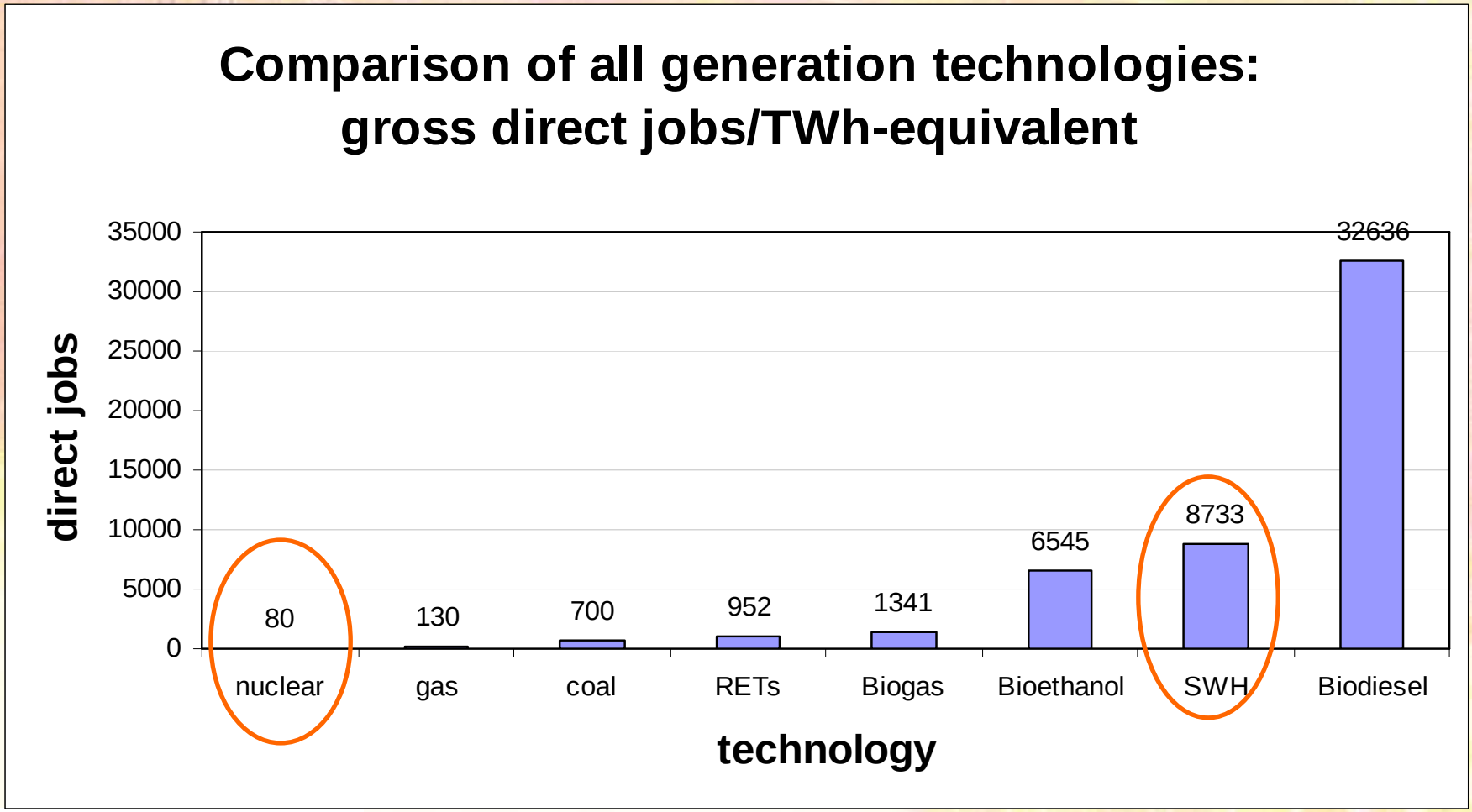
Employment trends in the SA electricity sector

Source: EPRESA report, Earthlife Africa, 2003



Employment potential in RE sector in SA

Source: EPRESA report by Agama Energy for Earthlife Africa, 2003

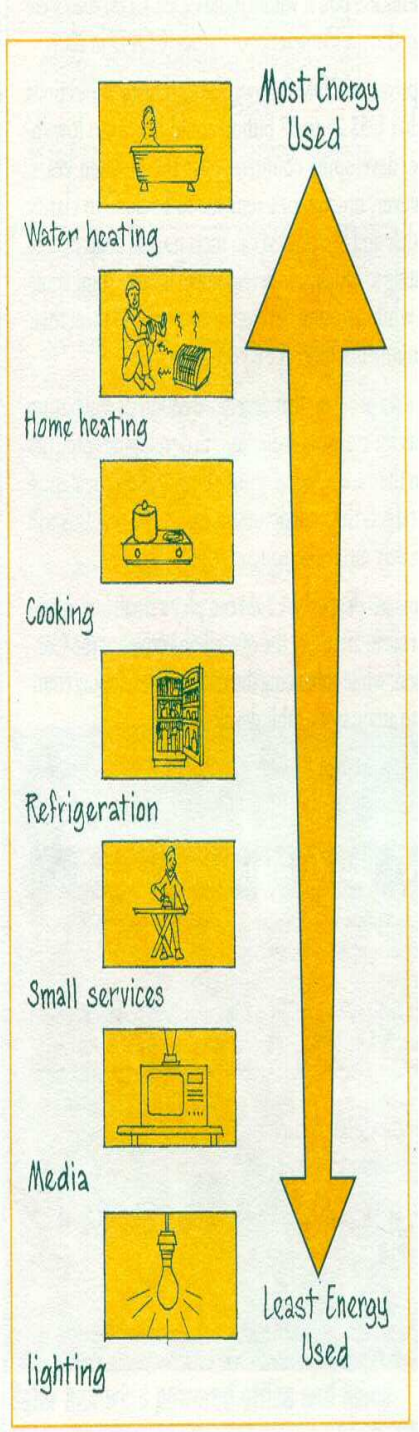


Energy & Poverty

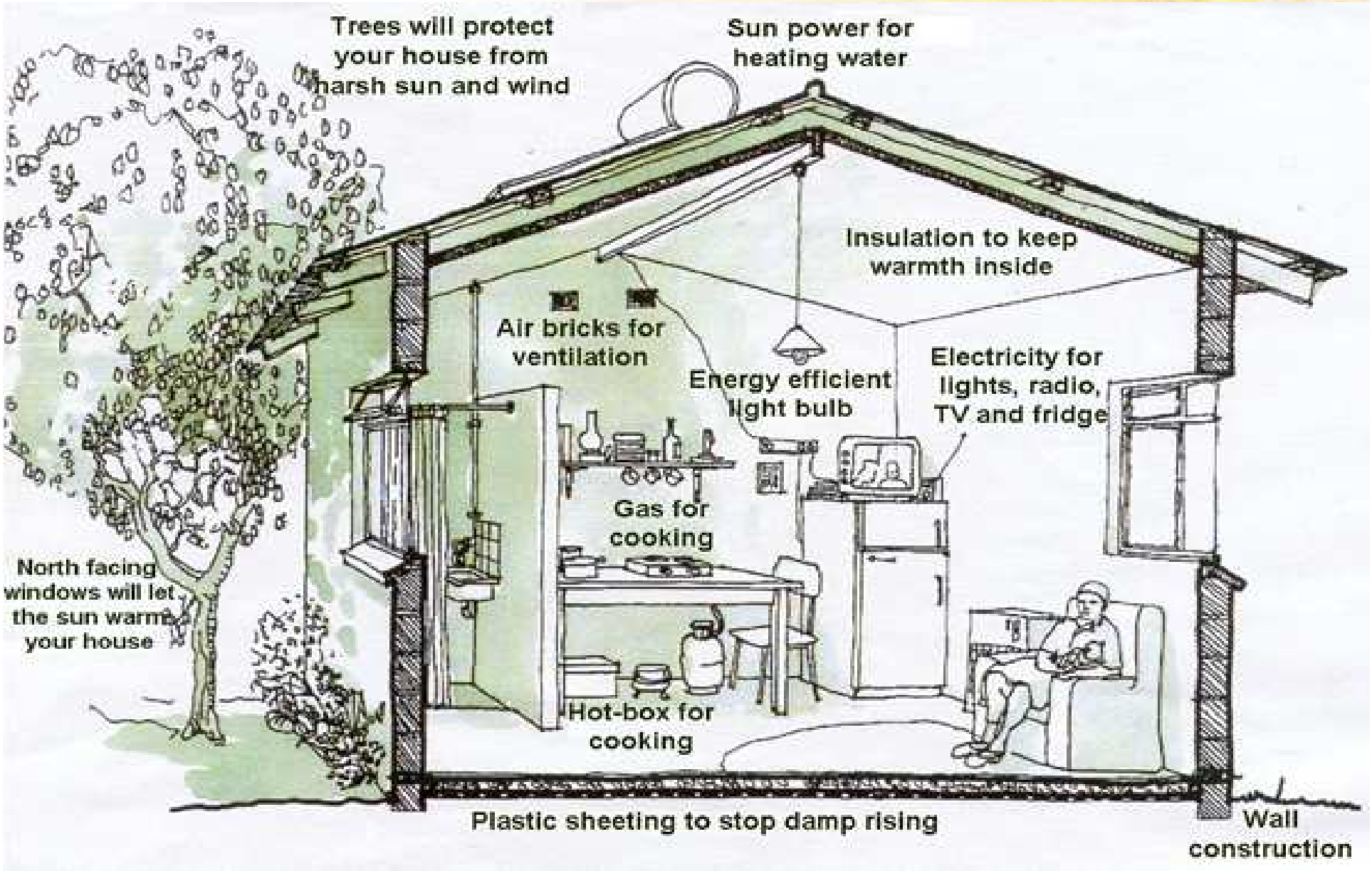
Parliar

Last year

- We saved 400MW in the Western Cape
- At fraction of cost of building a new power station (1MW to save & 10 Mil to generate)
- Addressing energy poverty better done through RE & EE interventions that just supplying more electricity



Improving quality of life through better energy services



Benefits of RE & EE

- Significant resource availability
- Mature & tested technologies
- International experience exists
- Financing options available
- Positive environmental legacy incl no waste
- Increased employment of appropriate skills base

Sustainable Development

Social

- Opportunities to facilitate gender equality,
- Stimulate Socio-economic development, job creation and poverty alleviation,
- Offers BEE investment opportunities,
- Improved health for all.

Environment

- RE helps reduce GHG emissions (climate change mitigation),
- Helps reduce environmental pollution and associated adverse health effects,
- Provides diversity of supply and thus energy security

Economic

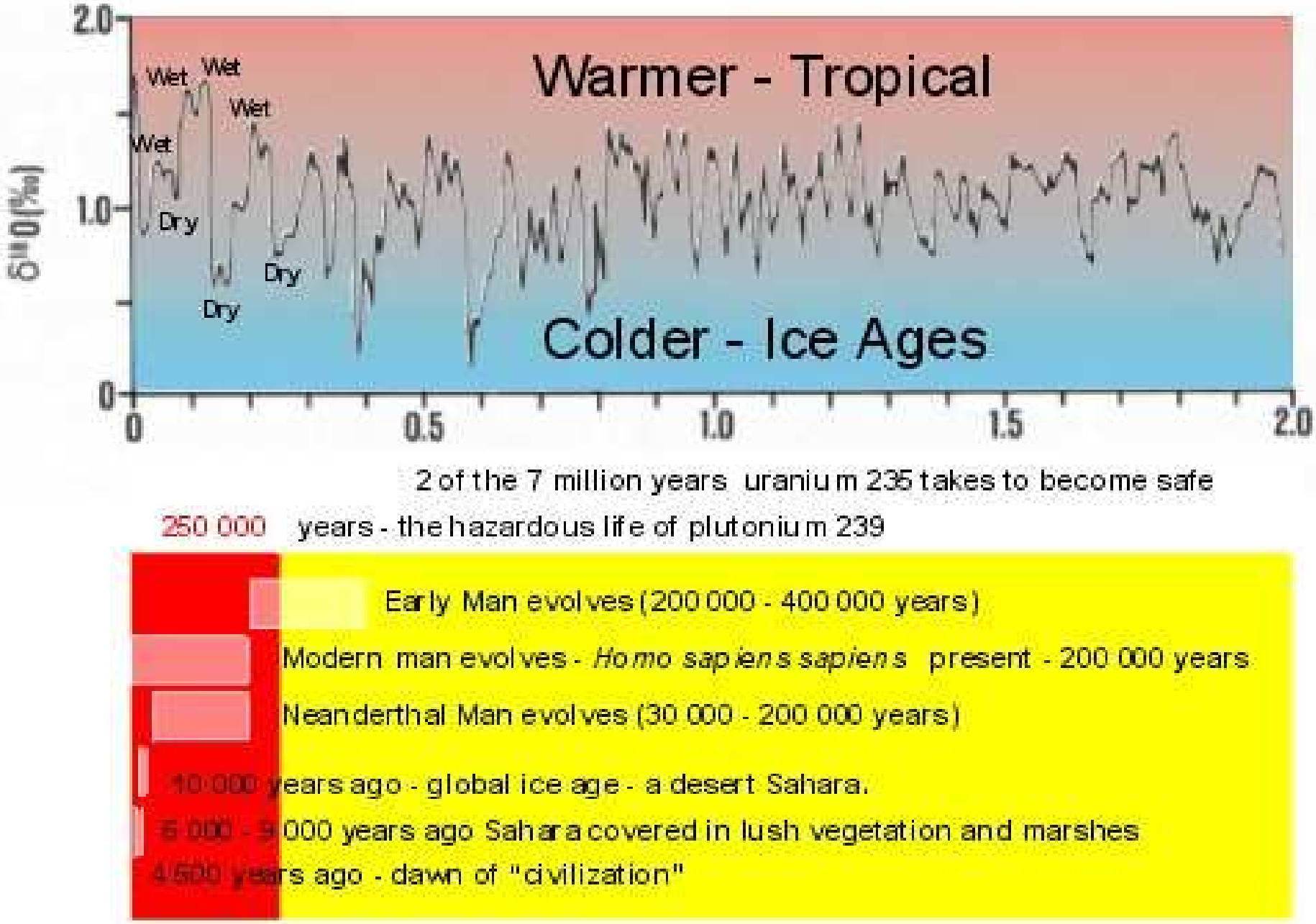
- Job creation,
- Community & industrial economic dev.
- Off-sets energy imports (BoP),
- Contribute to new generation capacity,
- Helps with DSM

Take Away message

- If not Nuclear Energy then …
- An energy alternative that puts power in the hands of people, creates appropriate skill level jobs, does not harm people or the environment and is based on a diversity of fuels that do not run out
- Sustainable Energy: The basket of renewable energy and energy efficiency options

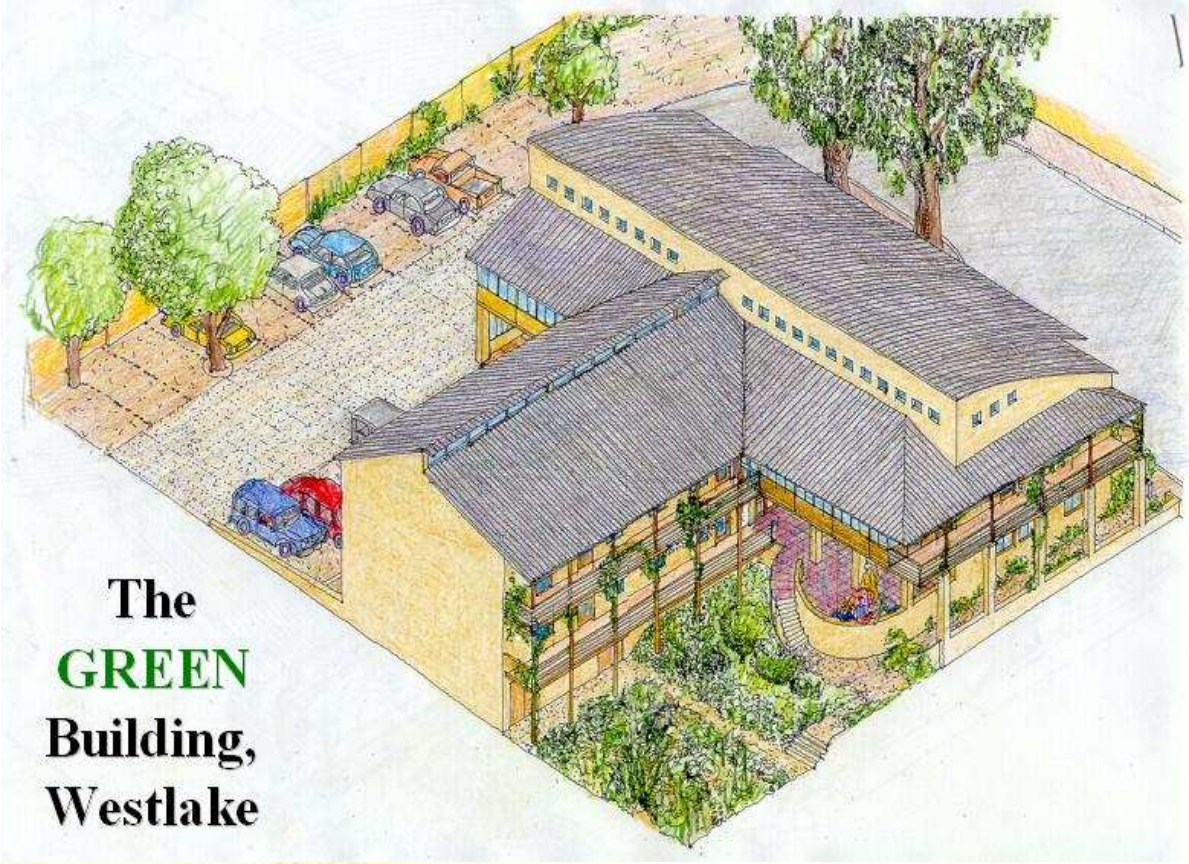
Our request to members of this parliamentary portfolio committee

- Can't deal with this complex issue in one day therefore:
  - Call for a bottom up participatory approach national summit on nuclear energy
- Finalise the National Framework on Sustainable Development
- Finalise the Integrated Energy Plan for SA with meaningful public participation
- Vote for more departmental funds to be allocated to activities that promote the development of Renewable Energy & Energy Efficiency
- Spread the message that there is another way
- Take the info you hear today to the appropriate processes so that we not left with the legacy of Nuclear Energy



Nik Wullschlegger for ELA 2003

Contact Details



The Green Building,
9B Bell Crescent Close,
Westlake, 7945,
Cape Town,
SOUTH AFRICA
tel: +27 (0)21 702 3622
fax: +27 (0)21 702 3625
e-mail:
info@sustainable.org.za
website:
www.sustainable.org.za

THANK YOU

Renewable potential SA

- SWH A recent study indicates that up to **43 TWh** of Electricity could be displaced by solar resources by 2030
- Wind: **66 TWh and 80 TWh** for the two renewable energy scenarios presented.
- In the longer term, we anticipate biomass contributing between **9 and 16** percent of the energy requirement.
- Landfill gas has a potential for **7.2 TWh** of electricity generation, perhaps growing to 10.8 TWh by 2040
- Waves then a total generating capacity of about **70TWh** could be installed.
- Ocean currents /geothermal after 2015, and by 2050, are assumed to yield **33 TWh** per year (medium renewables scenario)

.TOTAL BY 2050 = 267TWh (267000000 MWh)

NUCLEAR POWER …

Energy efficiency improvements in 423000 households = saving of 110 MegaWatts (cost of R4 billion).

1xPBMR = 110 MegaWatts and costs R10 billion.

<u>It's cheaper to save energy!</u>