Green jobs and industry

Environmental Goods & Services

EGS forum

Peet du Plooy

Contents

- **Defining** the Green Economy - Industry in a Greener Economy and/or Green Industries?
- **Investment** in the Green Economy - reality and prospects in SA and world-wide.
- **Competitiveness** in the Green Economy - does greening the economy raise or lower competitiveness?
- **Jobs** in the Green Economy - more or less?
- Where are the **biggest, fastest and cheapest opportunities** for investment, competitiveness and jobs.
- **Supporting** the Green Economy - Will it cost government money?
- **Regulatory** and **institutional** barriers/gaps.

EGS forum

Summary

South Africa needs a set of **supporting actions** by government to create the conditions for developing the **latent potential** for **investment**, **jobs** and **competitiveness** in the local EGS sector.

This will achieve a two-fold goal:

I. Rapidly (3 yrs) create accessible **jobs** in job-intensive industries with an **environmental pay-off**.

..and…

II. Strategic diversification of **energy sources** in electricity and transport; and **protection** of key natural resources (like water, soil and ecosystems), **starting now**.

Defining/Framing

Natural capital gain (prevent degradation/ polution and restore)	**Economic** capital gain (savings, investment, competitiveness)	**Social** capital gain (jobs, livelihoods, health)
Sustainable **energy** (efficient and renewable) or clean **air**	Industrial dev., Rural dev. (energization), Carbon competitiveness, Energy security	Decent, blue and white collar jobs
Fresh **water** (manage pollution and waste, restore catchments)	Water security	Rural job opportunities, health
Healthy **soil**	Food security, Savings on agri-inputs	Job-intensive agriculture
Efficient **materials** (waste management, recycling)	Resource savings	Job-intensive rather than energy-intensive materials
Functional **ecosystems** (conservation, corridors)	Tourism	Heritage

EGS forum

Defining/Framing

World trends and SA

SA share of world total :

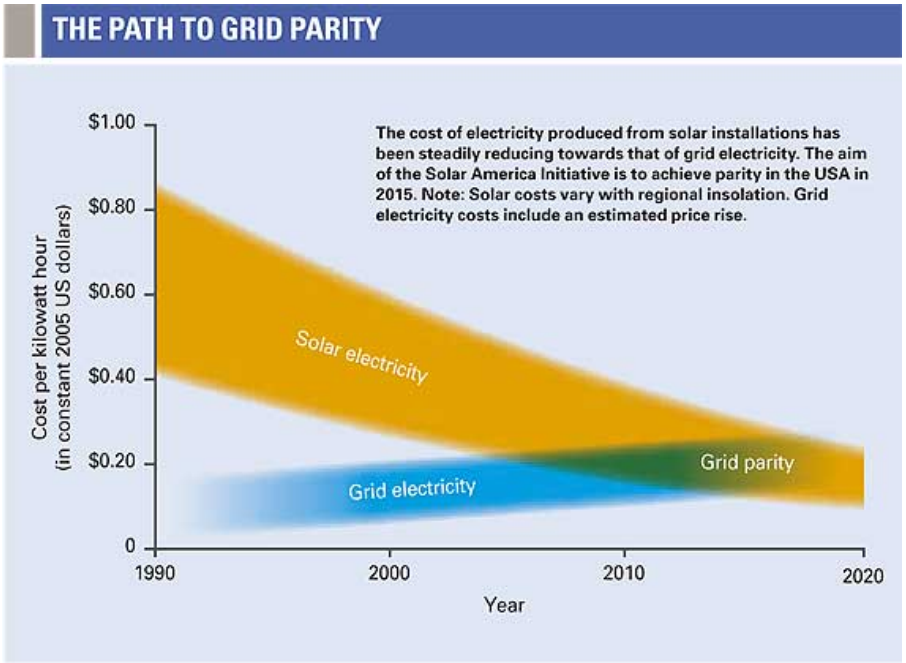
- CO_2: 1.6%
- Electricity: 1.4%
- GHG: 1.16%
- Energy Use: 1.14%
- Population: 0.73%
- Economy: 0.71%

(Source: cait.wri.org +)

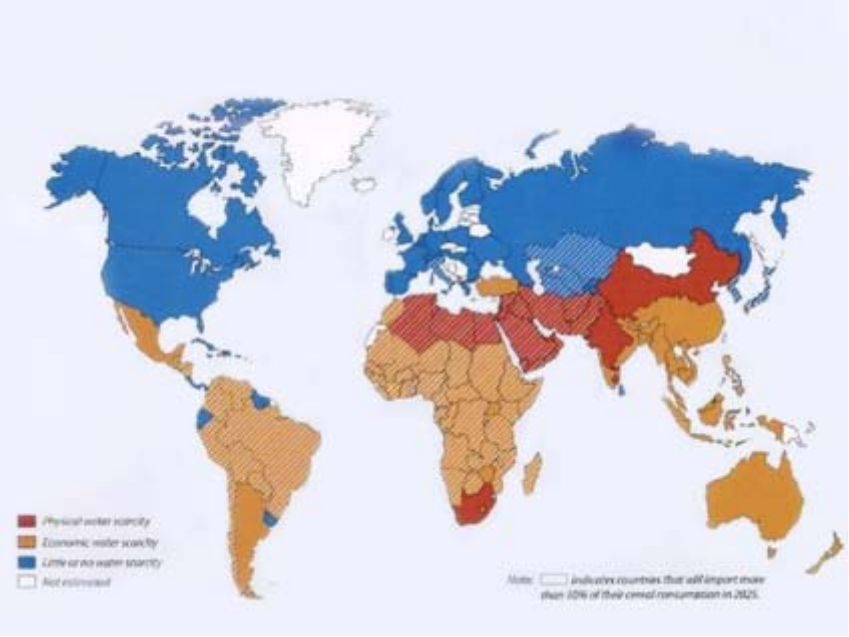
>> **The 1% rule** for “SA’s fair share”

Move to sustainability

not if, but when



(Graph source: BP)



…and who profits (most)

Green economy - investment

Global ("Traditional") EGS *(UK Treasury, 2004)*:

- 2004: $548bn
- 2010: $688bn
- 2015: just under $800bn

Global EGS *(ILO, 2008)*:

- 2008: $1 370bn
- 2020: $2 740bn

SA EGS *(Nedlac, 2006)*:

- R14.5bn-R23.2bn ($3-4bn) in '04
- between 1% and 1.6% of GDP
- between 0.44% and 0.7% of world
- **80% in waste management**

SA's 1% "fair share" *(UK)* = $5.5bn in 2004, *(ILO)* = $13.7bn in 2008

>> catching up would see EGS at least triple

EGS forum

The low-carbon sector

Global Low-Carbon EGS in 2008: £3 046bn =
$5 trillion

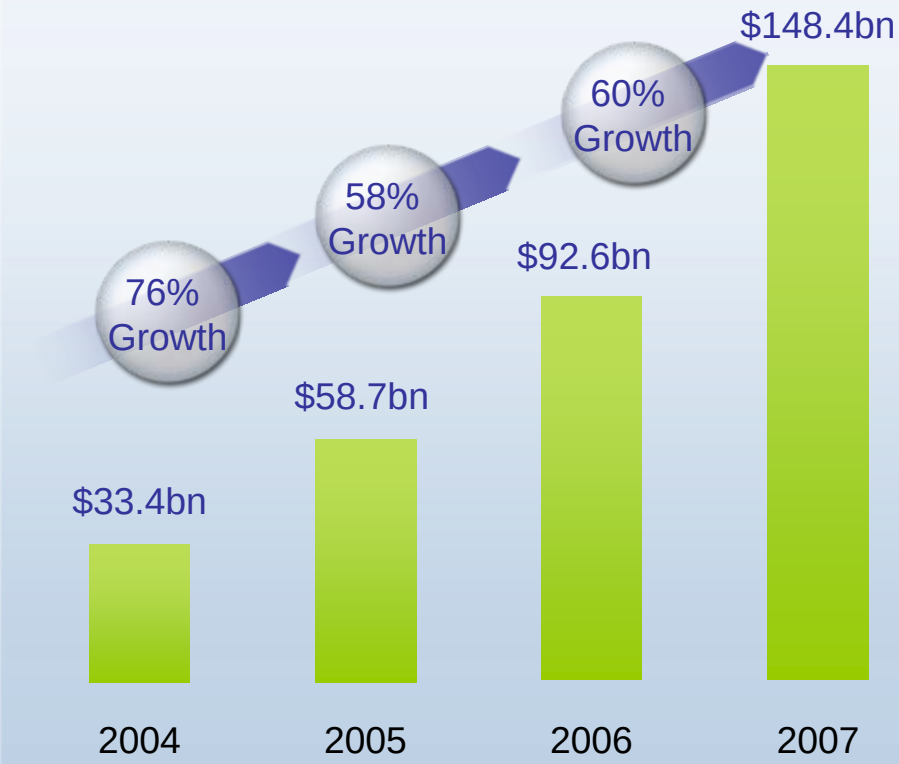
(UK Department of Business Enterprise and Regulatory Reform)

- Traditional EGS 21.6%
  (waste management, pollution control, recycling)
- Renewable Energy 30.9%
  (including hydropower)
- Emerging Low Carbon 47.5%
  (including alternative fuel, alternative fuel vehicles and building technologies)

SA 1% “fair share” = $50bn = R375bn = 7% of GDP

EGS forum

Clean energy investment



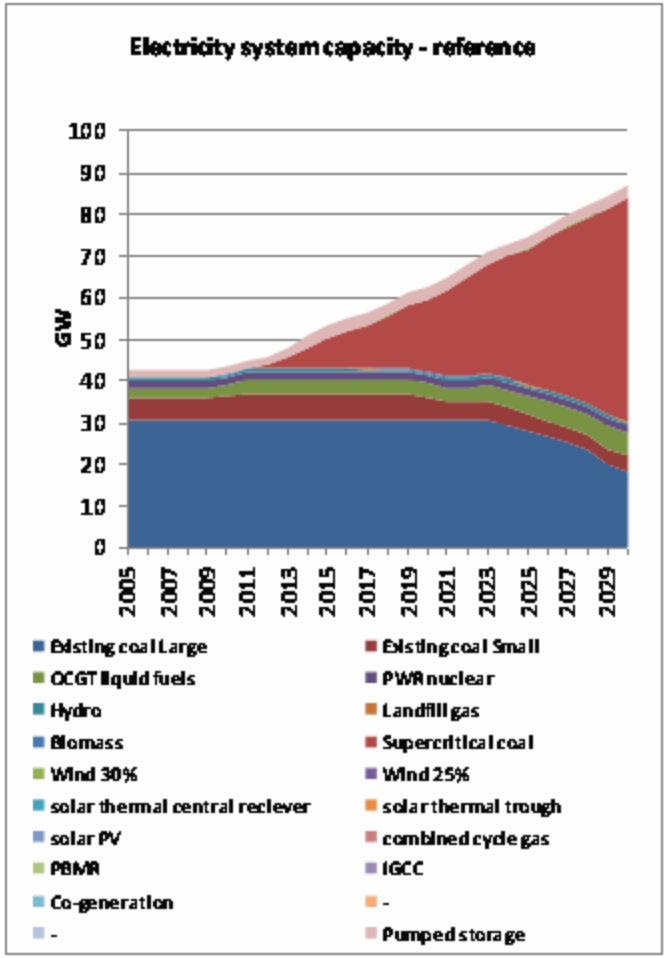
- **1%** of global fixed asset investment
- **19%** of global energy industry infrastructure investment
- Expected to reach **$450bn** in 2012 (UNEP)

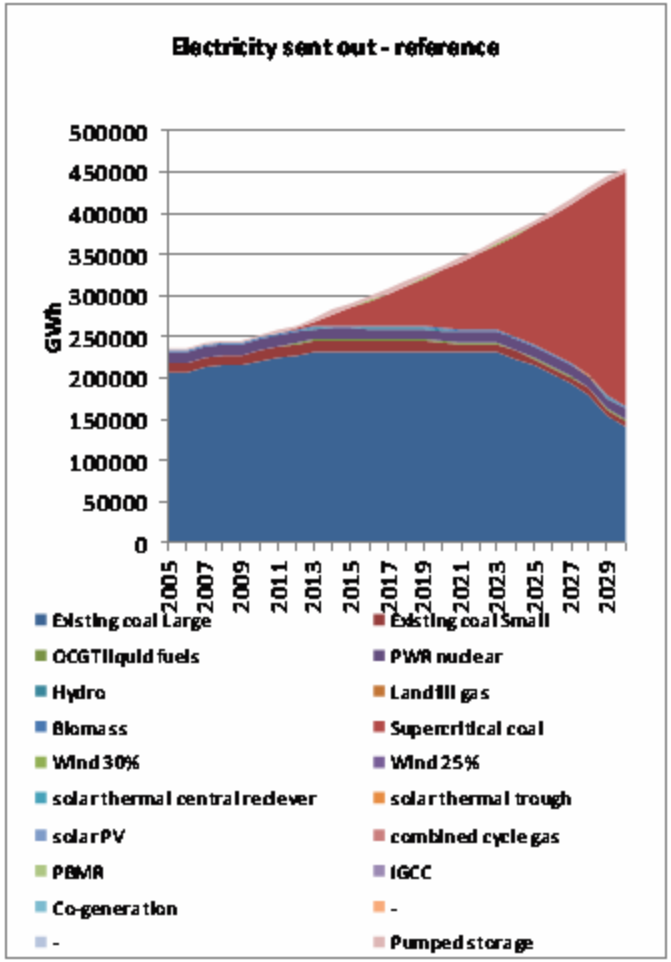
Adjusted for reinvestment. Geared re-investment assumes a 1 year lag between VC/PE/Public Markets funds raised and re-investment in projects.

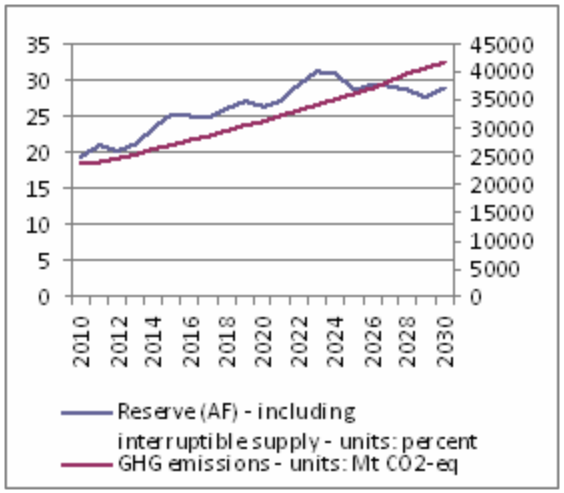
Source: New Energy Finance, IMF WEO Database, IEA WEO 2007, Boeing 2006 Annual Report

EGS forum

SA energy scenarios (BAU)

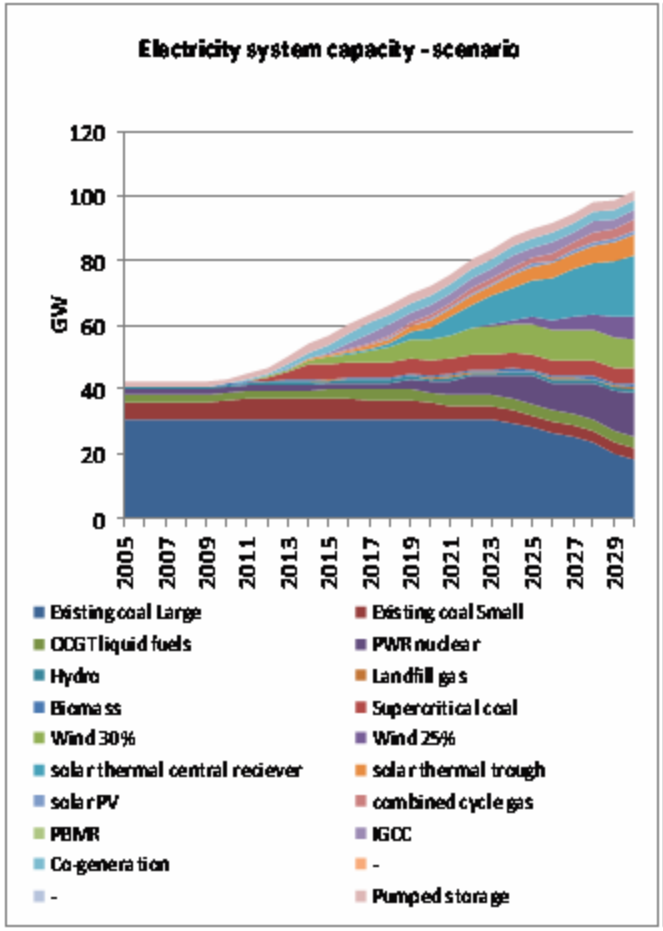


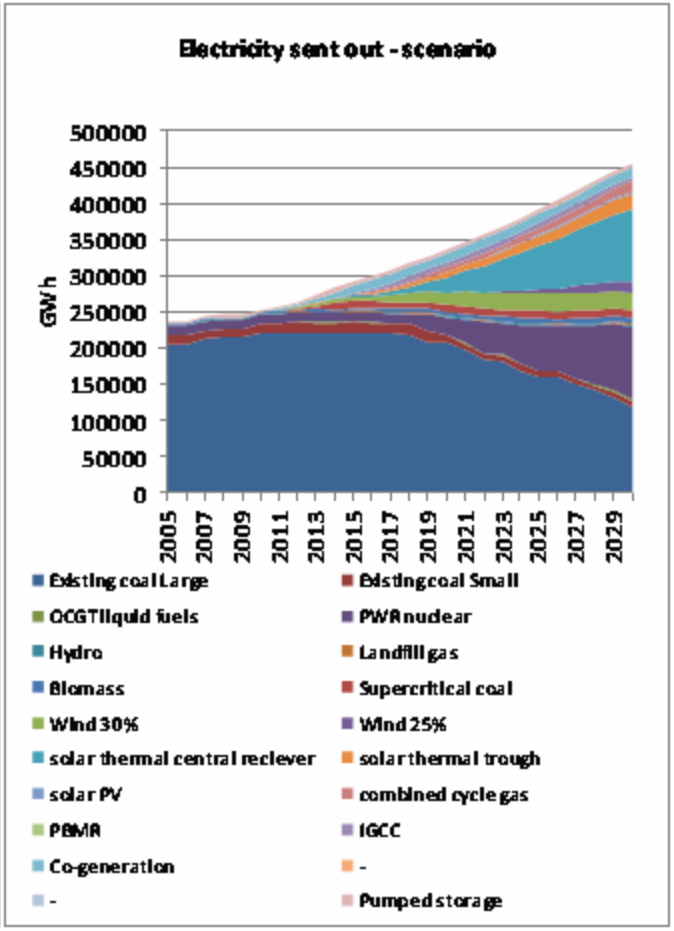


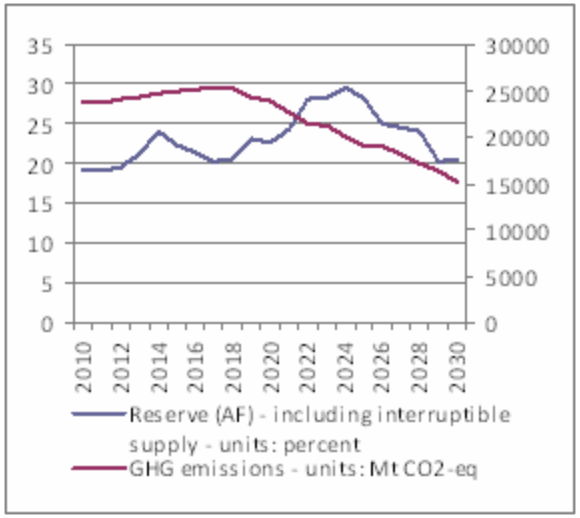


From WWF/ERC SNAPP energy model

SA energy scenario (Alt)

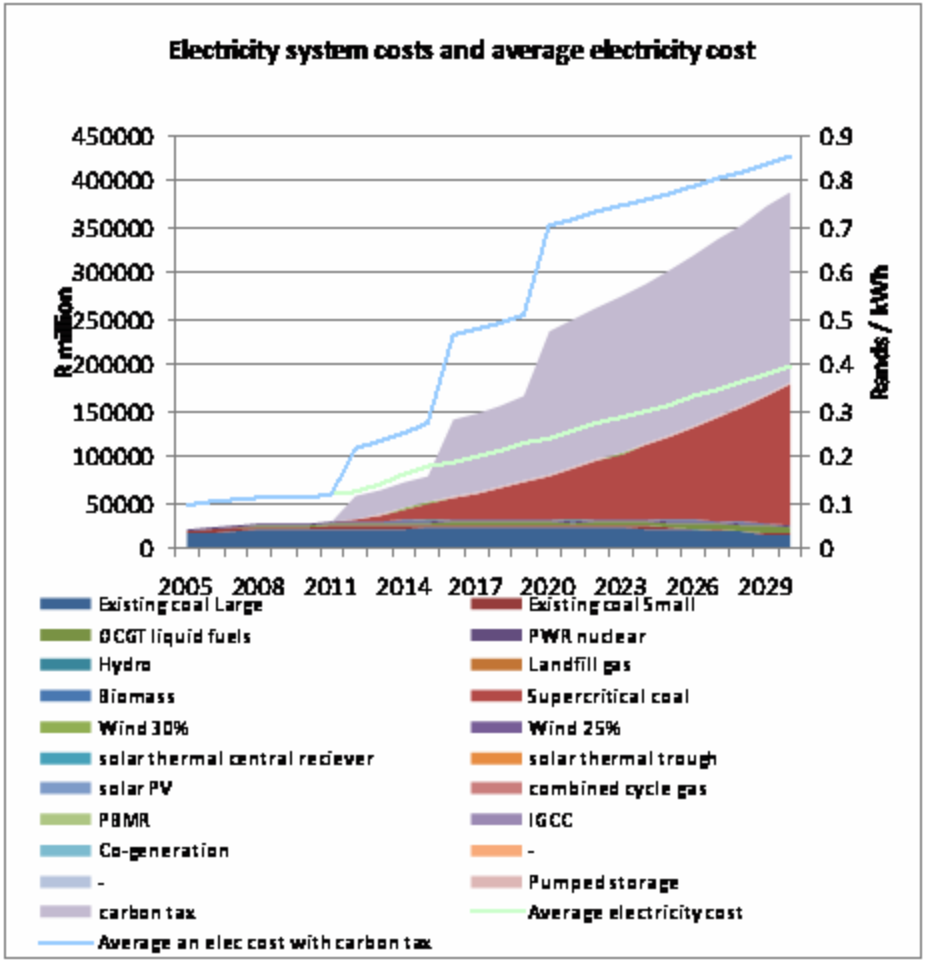


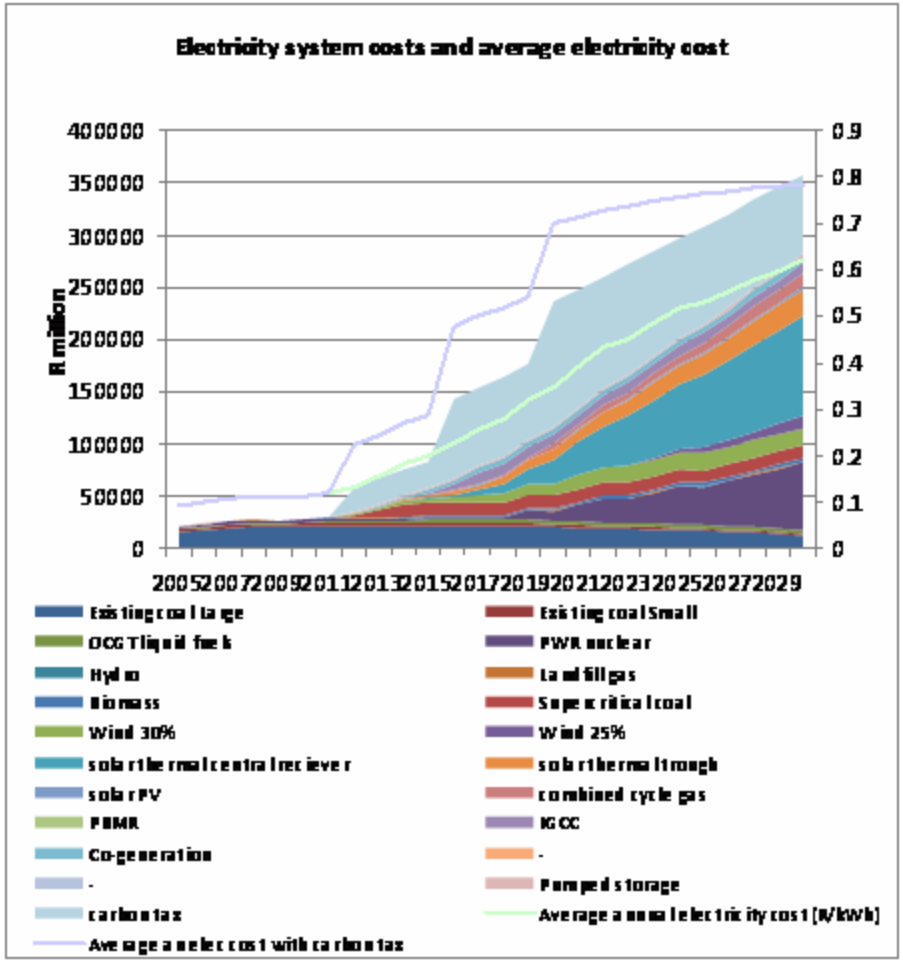




From WWF/ERC SNAPP energy model

SA energy scenario costs





From WWF/ERC SNAPP energy model

Affordable clean energy

Figure 12 – *Percentage increase in total annual production costs, Cases 1A to 3A, nuclear efficiency and efficiency alone*

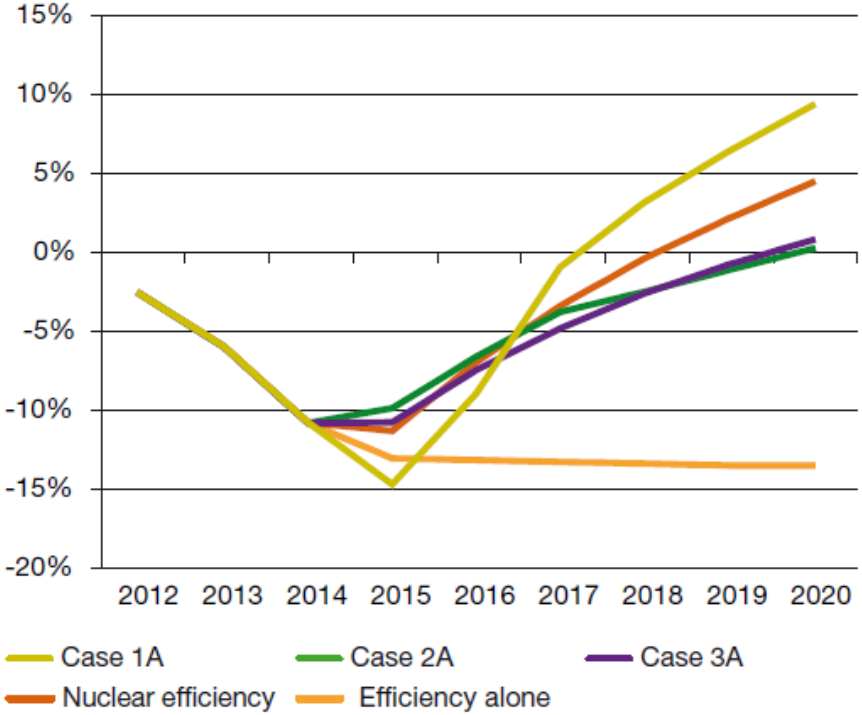
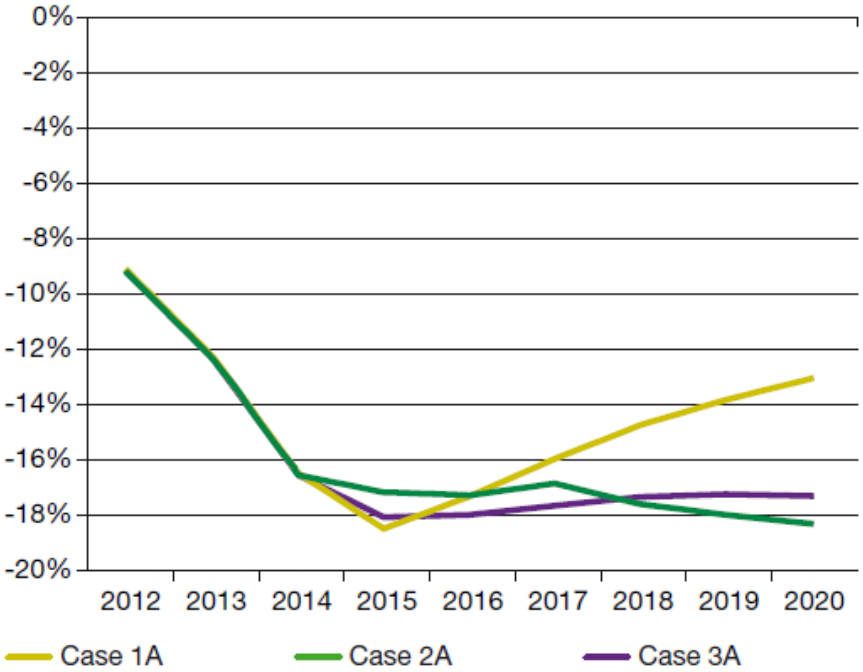
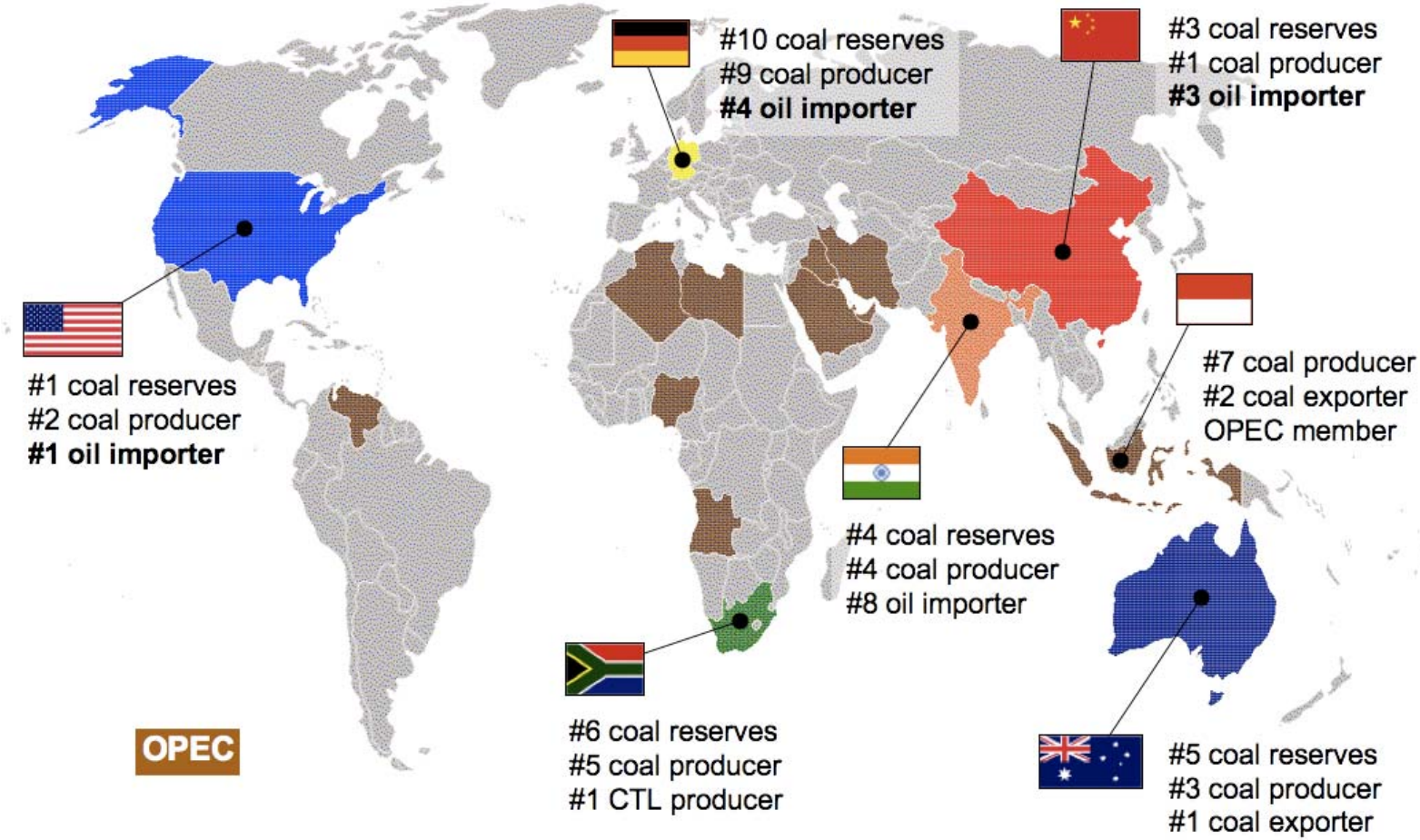


Figure 18 – *Impact of a Euro 20 carbon price on the % change from reference in average cost of electricity for Cases 1A to 3A (with carbon finance for energy efficiency as well)*



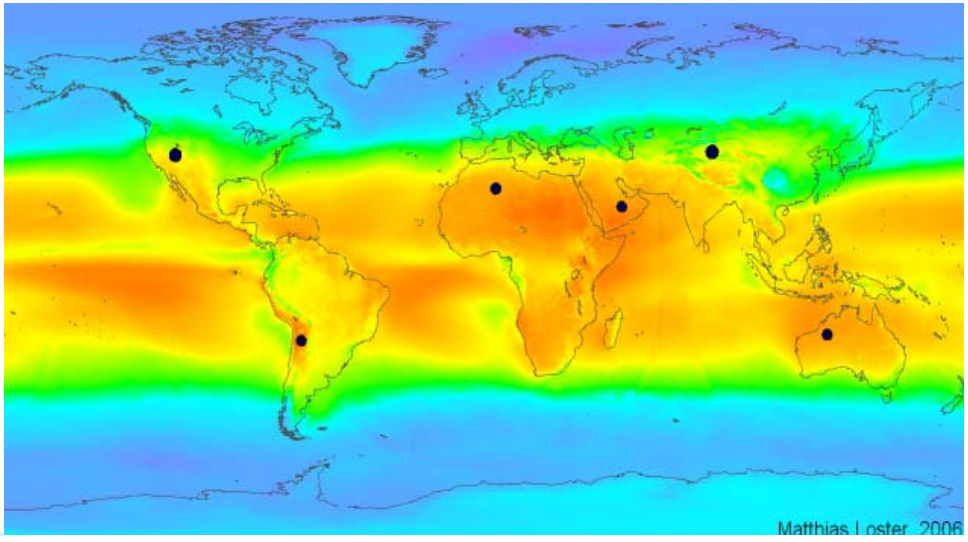
From WWF report:
"*Cheaper Electricity with Renewable Energy*"

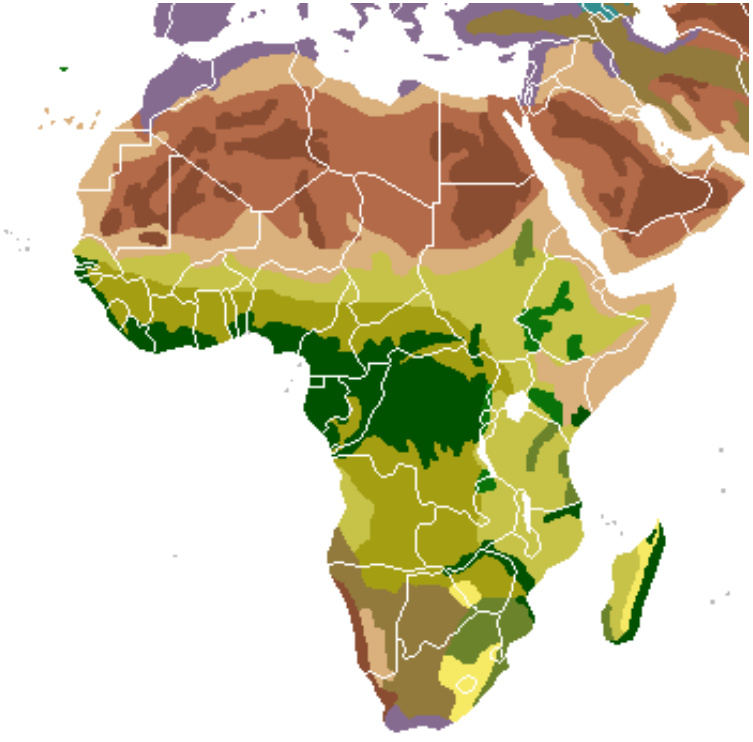
Competitiveness - resource

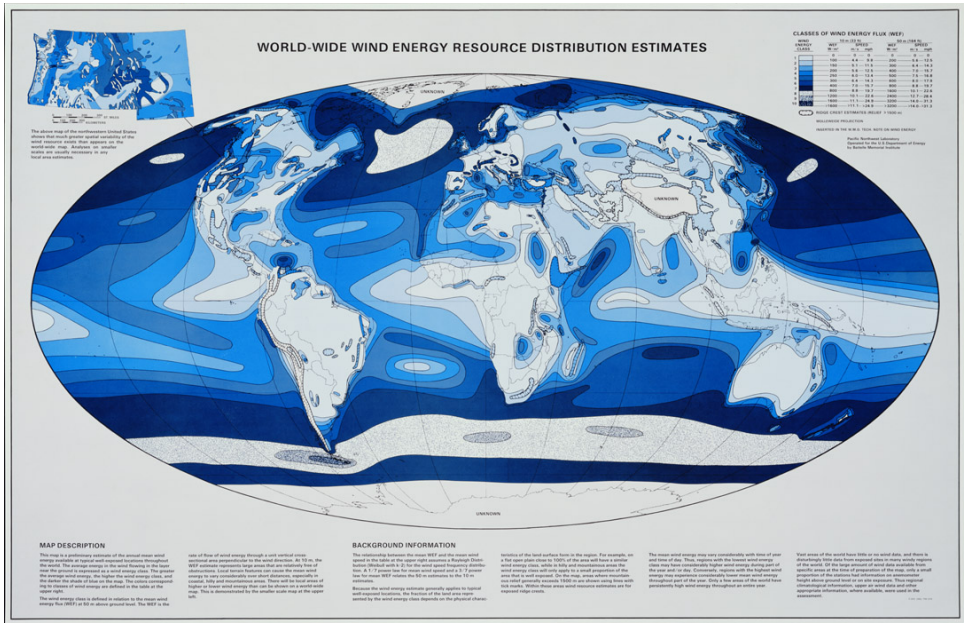


CTL = 2x Lifecycle GHG emissions, no clarity on CCS

Competitiveness - resource







Competitiveness - tech

EGS forum

Competitiveness - tech

EGS forum

Competitiveness - trade

Table 1: Balance of Emissions Embodied in Trade (BEET) for select countries

Annex B			Non-Annex B		
	BEET $MtCO_2$	BEET as a % of production-based emissions		BEET $MtCO_2$	BEET as a % of production-based emissions
Switzerland	-63.1	-122.9%	Singapore	-62.8	-128.2%
Latvia	-4.6	-60.7%	South Korea	-45.4	-11.4%
United Kingdom	-102.7	-16.6%	Morocco	-2.5	-6.3%
Germany	-139.9	-15.7%	Mexico	-17.6	-4.5%
Japan	-197.0	-15.3%	Brazil	+2.5	+0.8%
United States	-438.9	-7.3%	India	+70.9	+6.9%
Canada	15.5	+2.8%	China	+585.5	+17.8%
Australia	57.9	+16.5%	Indonesia	+58.1	+19.0%
Russia	324.8	+21.6%	South Africa	+123.5	+38.2%

Source: Peters and Hertwich, forthcoming.

% of emissions “imported”

Green jobs globally

Green jobs today *in RE only*: 2.3m

- Wind: 300 000
- PV: 170 000
- Solar Thermal: 600 000
- Biofuel: 1 000 000

ILO forecast for 2030:

- Wind: 2 100 000
- Solar power: 6 300 000

US case:
Coal mining + transport + power stations = **174 000** jobs

Wind industry = **83 000** jobs today, **110 000** jobs in **solar** within two years

Coal in SA:
< 50 000 jobs (mining + Eskom GX), of which **17 000 at risk** from strict global climate curbs (ILO)

SA's 1% "fair share" in:

RE today = 23 000 jobs
RE 2030 *(ILO)* = 21 000 wind + 63 000 solar jobs +…

RE 2013 *(DME target)* = 20 000 jobs

EGS forum

Green jobs globally

Table II.1-7. Estimated Employment per Megawatt, Renewable and Fossil Fuel Power Plants

	Average Employment over Life of Facility (Jobs per megawatt of average capacity)		
	Manufacturing, Construction, Installation	Operations & Maintenance/ Fuel Processing	Total
Solar PV	5.76–6.21	1.20–4.80	6.96–11.01
Wind power	0.43–2.51	0.27	0.70–2.78
Biomass	0.40	0.38–2.44	0.78–2.84
Coal-fired	0.27	0.74	1.01
Natural gas-fired	0.25	0.70	0.95

Note: Based on findings from a range of studies published in 2001–04. Assumed capacity factor is 21 percent for solar PV, 35 percent for wind, 80 percent for coal, and 85 percent for biomass and natural gas.

From UNEP/ILO Green Jobs

Green jobs globally

Renewable energy jobs that could have been if SA compared to others…

Country	RE jobs	SA's % of country's GDP	GDP-equivalent jobs	SA's % of country's population	Population-equivalent jobs
China	943 200	6%	57 000	3.7%	37 000
Germany	259 100	7.5%	19 000	60%	155 000
Spain	89 001	17%	15 000	106%	94 000
US (direct only)	193 550	2%	4 000	16%	31 000
US (incl. indirect)	446 320	2%	9 000	16%	71 000

Adapted from UNEP/ILO Green Jobs

EGS forum

Green jobs in SA

Resource savings:

- *Working for Water:* **23 000 FTE/person-years employment**
  > biggest employment programme in the country, global role-model

- *Recycling:* Collect-a-Can > **35 000 incomes**

Sustainable transport:

- *Gautrain*: **148 000 jobs** (over 20 years)

- *Motor industry*: **60 000 existing jobs (down from 85 000)**
  - Green MIDP? Electric + local switch. Joule i.s.o. Hummer factories?

  - Manufacturing stimulus from a Solar Industry Development Plan?

Green jobs in SA

Renewable Energy – Working for Energy

- *Biogas*:

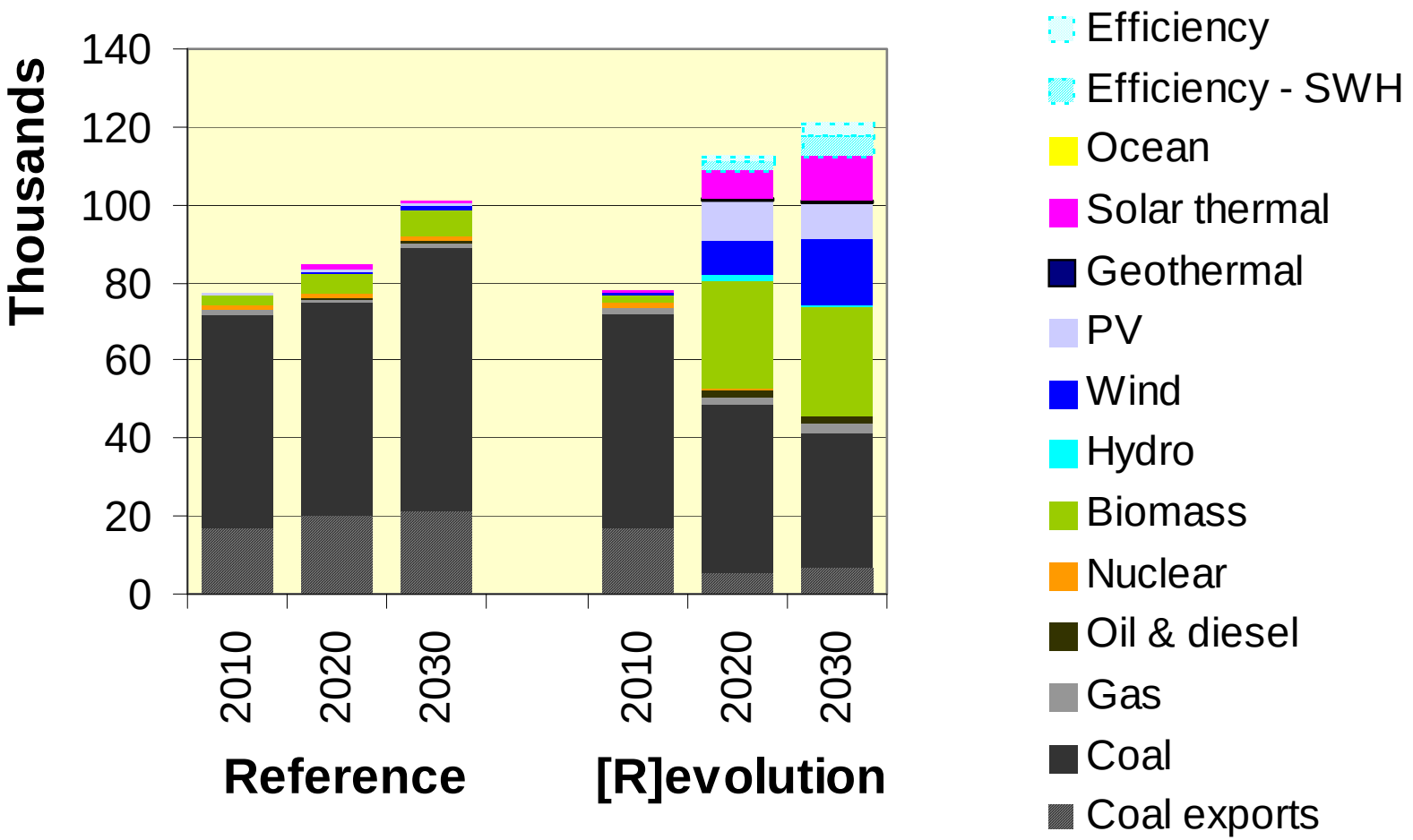
  310,000 rural households in SA have the technical capacity to generate energy from cow dung and human waste in biogas digesters. They can:
  - be energy independent.
  - save R325m per year in energy cost, or
  - generate R1,2 billion in value as LPG replacement.
  - generating **45 000 person years in job opportunities**

- *Solar waterheating:*

  ~3m electrical heaters installed since 1997.
  Solar panels could have saved 2 000MW (averting energy crisis of 2008?).
  Cost of replacing electric geysers = R30-billion.
  12 000 jobs in 2015? (~4% of Chinese jobs today)

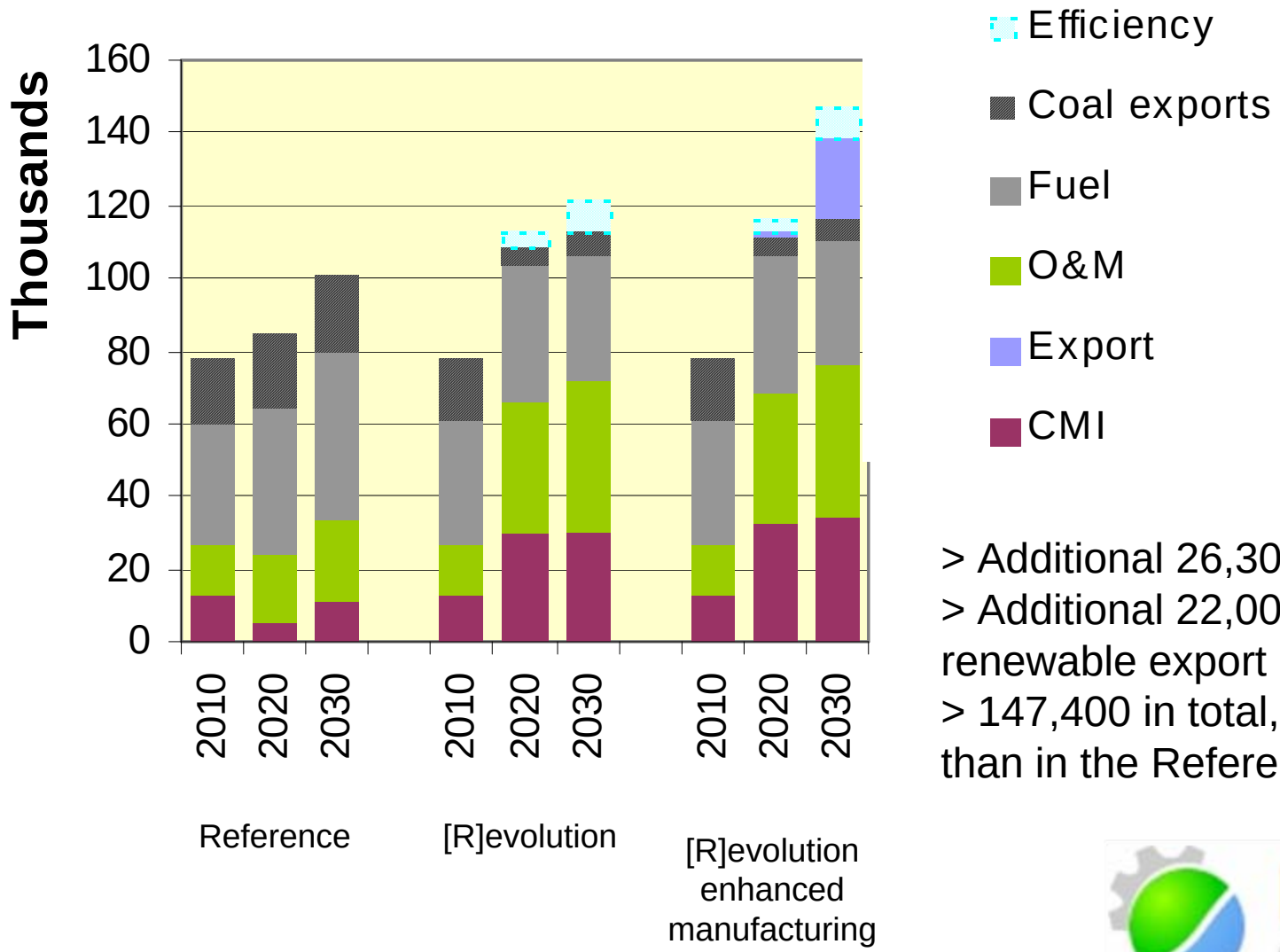
EGS forum

Green jobs in SA



From Greenpeace SA presentation to NERSA

Green jobs in SA



> Additional 26,300 jobs
> Additional 22,000 jobs in renewable export
> 147,400 in total, 45% more than in the Reference scenario

Jobs in a green economy

Contribution to GDP

“Big Five”

• finance, real estate and business services	20.68%
• manufacturing	18.24%
• wholesale, retail, catering and accommodation	15.09%
• general government services	14.61%
• transport, storage and communication	10.25%

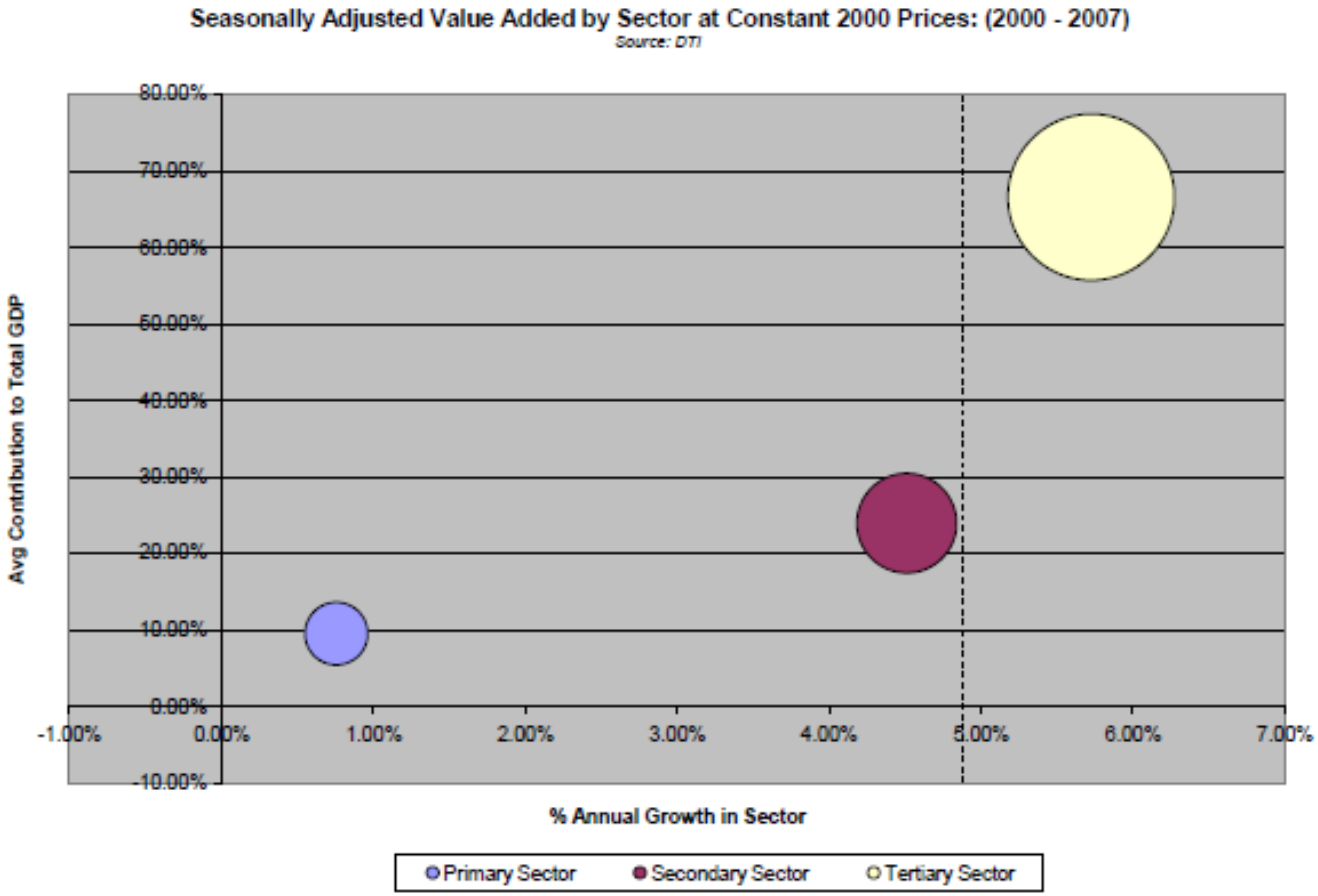
“Small Five”

• mining and quarrying	6.71%
• personal services	5.92%
• construction	3.23%
• agriculture, forestry and fishing	2.79%
• electricity, gas & water	2.47%

Source: DoA

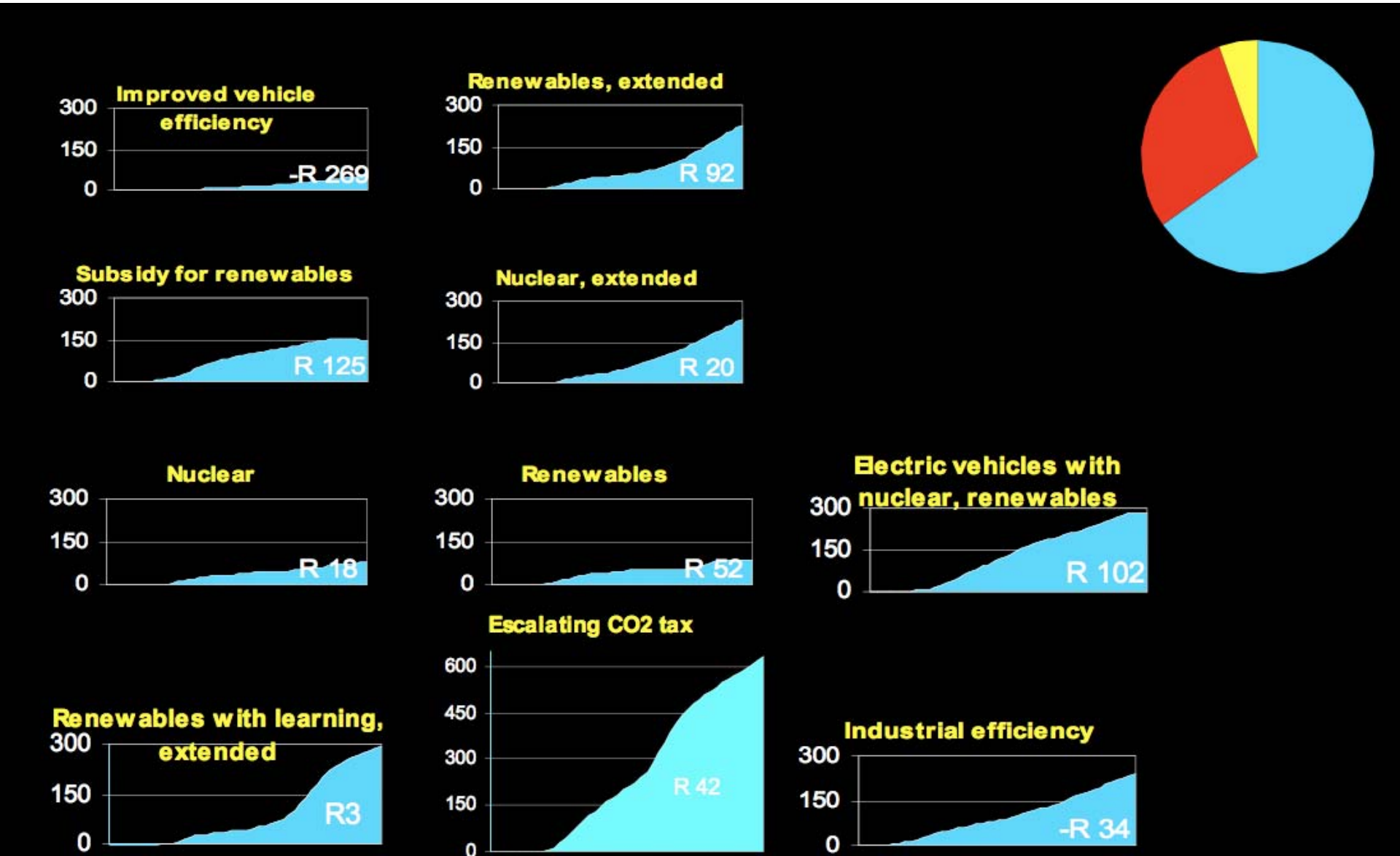
EGS forum

Jobs in a green economy



From Dept. Agriculture

Big wins - climate



Big wins

Investment	Competitiveness	Jobs
Renewable energy: solar, wind, bio-energy [**R10bn's**]	Solar, coastal wind **electricity**	**White collar**: [**5 000+**] in planning, engineering, enviro-management…
Transport: EV (batteries) and public transport [**R10bn's**]	**Water** savings and waste water treatment	**Blue collar**: [**20 000+**] energy supply and savings component manufacture and installation
Energy savings: SWH, smart meter [**R1bn's**] (+ deferred power station investment)	Public **transport**: displace imports, working cities	**Opportunities**: [**100 000+**] in Working for's, land-based (eg. bio-energy) and recycling
ICT: Smart grids, buildings	**Motor industry**: move to EV and redeploy skills + mnf. capacity in clean energy	**Livelihoods**: bio-energy, PV, PES [**500 000+**]

Focal areas

Two-tiered approach:

I. Short-term, “low-hanging fruit” with large job creation (and/or sustainable livelihood) potential:

1. Solar waterheaters: DFI (DBSA) finance support, WfE labour support
2. Working for Energy: rural biomass energization
3. Waste recycling: separation at source, MRF finance
4. Smart meters: a smart grid component

II. Medium-term, strategic industry and infrastructure development with large emissions-abatement, local manufacture and national competitiveness potential:

1. Bulk renewable energy:
   a) solar thermal electricity & wind power
   b) waste-to-energy (landfill, MSW) & cogeneration
   c) energy storage (batteries, fuel cells, thermal, kinetic, pumped)
2. Sustainable transport:
   a) electric vehicles
   b) public transport
3. Water treatment: effluent treatment, desalination
4. Land-based carbon: aforestation, soil carbon?

IPAP priorities

More detail on clean energy (renewable and efficiency) potentials and actions. Ambition beyond IRP1.

Government **facilitation** of private sector **investment**. (Beyond Eskom)

Electricity industry reform (Independent System Operator)

Front-load for investment: Solar/Wind Parks, Bulk finance with guarantees, programmatic CDM

Government niche is in direct public works job creation (eg. Working for Energy)

EGS forum

Support actions

Actions to address barriers to industry development
Red = DTI, Blue = DFI + Treasury, Green = line department

Activity	Support for cost barrier	Support for market barrier	Support for regulatory barrier
I.1 Solar waterheaters	Low-cost finance of capital cost, temporarily drop import tariffs on SWH *components* to supplement limited local manufacturing	Bulk purchase by munics (utility model), SWH mandatory in new buildings, expanded to all buildings over time, starting with the largest.	Enable munics/REDs to administer SWH payments through their utility billing systems
I.2 Working for energy (rural biomass)	Low-cost finance of capital cost	No ability to purchase: state-funded under EPWP	Expand free basic energy to off-grid and beyond electricity
I.3 Recycling	Low-cost finance of capital (MRF) cost, mandatory separation at source	Government preferential procurement of recycled material	?
I.4 Smart meters	Install under DSM programme	Smart meters mandatory in large homes and buildings	Facilitate reverse-metering
II.1 a) Bulk renewable energy: solar, wind	Low-cost finance of capital cost, temporarily drop import tariffs on RE *components* to supplement limited local manufacturing, feed-in tariff	Government preferential procurement of renewable energy	Wind and Solar Development Zones with grid access and pre-checked impact assessment > save 18 months on project cycle.
II.1 b) Bulk renewable energy: waste-to-energy,	Low-cost finance of capital cost, feed-in tariff	Government preferential procurement of renewable energy	Set standards and streamline regulations for waste-to-energy facilities
II.1 c) Bulk renewable energy: energy storage	Low-cost finance of capital cost, feed-in tariff	Government preferential procurement of renewable energy	Set a “feed-in” tariff for emissions-free energy storage.
II.2 a) Electric vehicles	Low-cost finance of capital (battery) cost, EV tariff	Government preferential procurement of electric vehicles	Set a “feed-in” tariff for emissions-free energy storage.
II.2 b) Public transport	Low-cost finance of capital cost	?	?
II.3 Water management	Low-cost finance of capital cost	?	Improve enforcement
II 4 Land based carbon	Payment for Ecosystem Services	Carbon markets	Sustainability standards

Legislative priorities

Realizing 2008 Energy Act (Planning)

Realizing NEMA

Renewable Energy Act? (% share, obligation to purchase)

MFMA competencies (enable contracting for clean energy)

Green Economic Empowerment / Preferential Procurement (vehicles)

Contact

Peet du Plooy

Chair: EGS Forum

073 559 4796

peet.duplooy@reverse-entropy.com