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Accelerating Renewable Energy Deployment



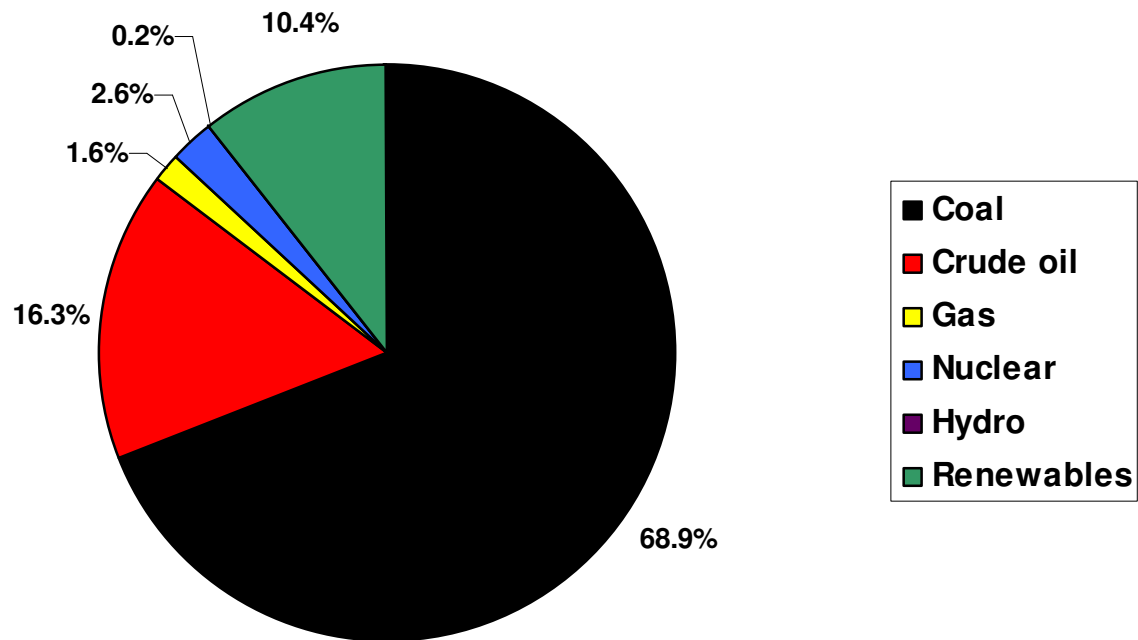
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Total Energy Supply



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Total primary energy supply



A case for Renewables



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SA among highest emitters of [carbon dioxide](#) in the world

More than 75% of primary energy requirement from fossil fuels
SA ranked 12th in the world in terms of top emitters

Urgent need:

- Reduce fossil fuel dependency
- Reduce carbon footprint
- Diversify our energy mix and supply

Solution (no panacea)

- RENEWABLE ENERGY – resources are abundant, sustainable, can be implemented quickly, offer more work opportunities and have a much lower impact on the environment

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South Africa's Fuel needs



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- South Africa's demand of transport liquid fuels (petrol, diesel, jet fuel) in 2007 was 23 707 million litres, according to SAPIA. Eskom gas turbine power plants may have consumed 600 million litres, assuming 6hrs per day, 261 days, 7 turbines each 150MW
- About 36 percent of total liquid fuels (petrol, diesel, jet fuel, paraffin, bitumen, fuel oil, LPG) demand is met by synthetic fuels (synfuels), which are produced locally, largely from coal and from natural gas
- The petrol/diesel price in South Africa is linked to the price of crude oil in international markets. Crude oil prices combined with the Rand/Dollar exchange rate therefore have a major impact on petrol/diesel prices

Energy Innovation For **Clear case for alternative Fuels**

Renewable Energy Sources



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Biomass



Solar



Wind



Ocean



- Natural resources
- Naturally replenished

Drivers?



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- 🔥 Increasing energy equity, reducing poverty and using energy for job creation
- 🔥 Climate Change
 - 🔥 Global warming
 - 🔥 CO₂ emissions
- 🔥 Energy supply diversification
 - 🔥 Imbalance of reserves
 - 🔥 Energy security
- 🔥 National Policy
 - 🔥 National target – Renewable Energy Production of 10 000 GWh by 2013 (was confirmed to be economically viable with subsidies and carbon financing)
 - 🔥 Biofuels Industrial Strategy 2007 – 2% penetration by 2013

Renewable Energy Strategy



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Phase	Technologies
Phase 1. 1 st July 2004 – 30 th June 2007	Biogas Solar Water Heating Mini-hydro
Phase 2. 1 st July 2007 – 30 th June 2010	Small wind turbines PV Biogas Solar Water Heating
Phase 3. 1 st July 2010 – 30 th June 2013	Large Wind Turbines Concentrating Solar Power Wave Power Biofuels Mini-grids

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Renewable Energy Target



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Achieving the target will:

- 🔥 Add about 1.667MW new renewable energy capacity, with a net impact on GDP as high as R1.071-billion a year;
- 🔥 Create additional government revenue of R299-million;
- 🔥 Stimulate additional income that will flow to low-income households by as much as R128-million, creating just over 20 000 new jobs; and
- 🔥 Contribute to water savings of 16.5-million kilolitres, which translates into a R26.6-million saving.

Review in 2009 shows that we have only achieved 3%!

Biofuels Industrial Strategy



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- 🔥 stimulate rural economy, create jobs, help reduce greenhouse gas-emissions and bridge gap between the first and second economy
 - 🔥 2% penetration or 400 million litres pa by 2013 (can be achieved without jeopardising food security)
 - 🔥 Specified energy crops to be used :
 - Sugar cane
 - Sugar beet
 - Soya beans
 - Canola
 - Sunflower
- 🔥 Proposed fuel levies exemptions
 - 🔥 Biodiesel increased from 40 to 50%
 - 🔥 100% for bioethanol

Energy  *Transition For Life*

Biofuels Industrial Strategy – Cons and Pros



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Cons

- Target will only utilise 1.4% arable land
- 14% of the arable land is underutilised (mainly in former homelands)
- Feedstocks specified are food crops even though maize and jathropa have been excluded

Pros

- 🔥 Impetus to 2nd generation technologies to utilise total plant biomass and alternative feedstocks e.g. sweet sorghum and triticale
- 🔥 Will be reviewed in 2012

Biomass availability (Lynd *et al* 2003)



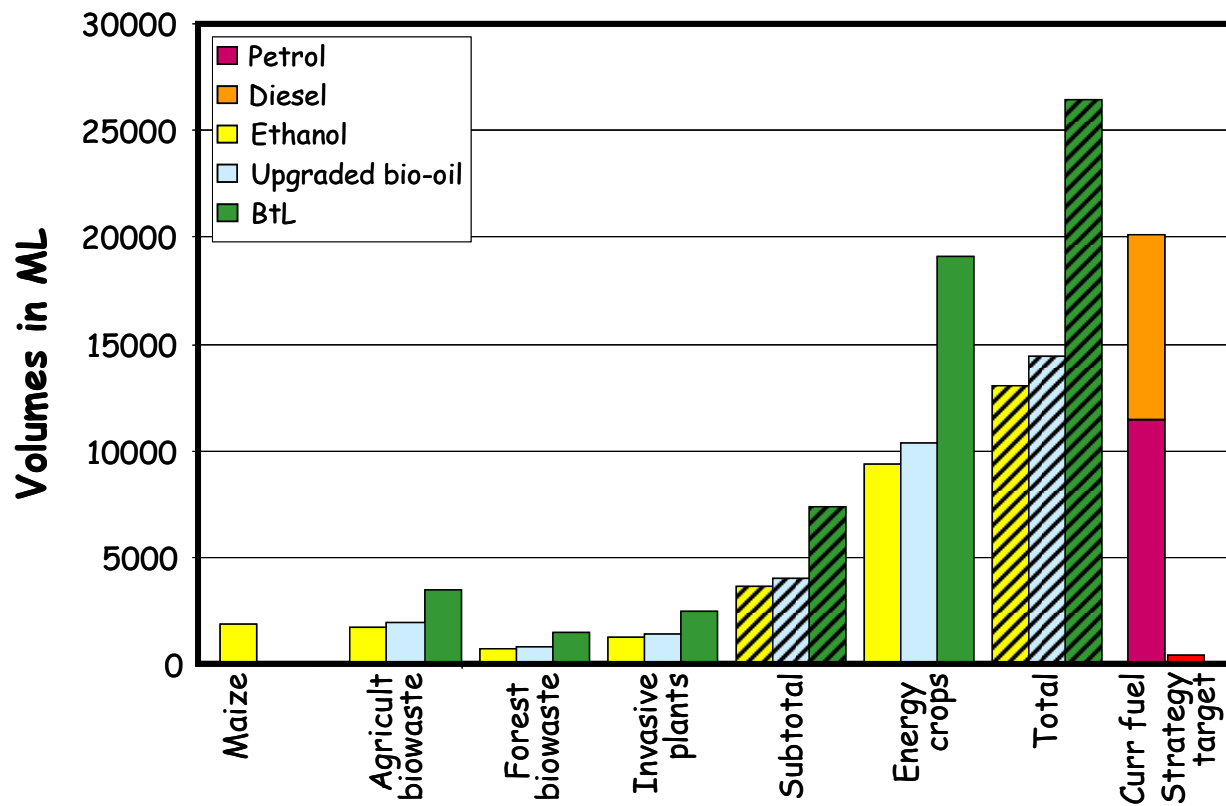
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Feedstock	Biomass yield (million tonnes/annum)
Agricultural	
Maize stover	6.7 Mt/a
Sugar cane bagasse	3.3 Mt/a
Wheat straw	1.6 Mt/a
Sunflower stalks	0.6 Mt/a
Agricultural subtotal	12.3 Mt/a
Forest industry	
Left in forest	4.0 Mt/a
Saw mill residue	0.9 Mt/a
Paper & board mill sludge	0.1 Mt/a
Forest industry subtotal	5.0 Mt/a
<i>Energy crops:</i>	
From 10% of available land	67 Mt/a
<i>Energy Innovation For Life</i> Invasive plant species:	8.7 Mt
Total, annual basis	92.7 Mt/a

Potential biofuels from Lignocellulosic biomass (50%)



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REFIT



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Phase 1

Technology

☀ Small hydro	94 cents /kWh
☀ Wind	R1,25
☀ Landfill Methane	90 cents
☀ CSP (Concentrated Solar Power)	R2,1

Phase 2

☀ CSP : without storage:	R 3.13/kWh
☀ 6 hour storage:	R 2.31
☀ Biomass (excludes industrial co-gen)	R 1.18
☀ Biogas	96 cents
☀ Solar PV (> 1 MW)	R 4.48
☀ Concentrating	R 5.48

NO PPA!

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Barriers to Rapid Deployment



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RE target in place since 2003 and Biofuels Industrial Strategy in 2007, REFiT , but investments in biofuels in South Africa have been very modest

So what's the problem???

- 🔥 Human capacity
- 🔥 R&D Funding – 0.91% GDP (0.8%)
- 🔥 Land and water use – concerns of land use and water availability
- 🔥 Policy and regulatory framework
 - 🔥 Prescribed contributions from RE not regulated
 - 🔥 No mandatory blending
- 🔥 Project Finance - conditions precedent for financing of projects remain onerous, even though number of financing institutions have developed green financing options

Actions to scale up use



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- 🔥 Create supportive policy and institutional frameworks
 - 🔥 Targets for renewable energy share
 - 🔥 Feed-in tariffs
 - 🔥 Blending mandates
 - 🔥 Tax incentives and subsidies
 - 🔥 Increased public sector funding for R, D & D
- 🔥 Promote private sector involvement
 - 🔥 Public private partnerships
 - 🔥 Innovative financing mechanisms
 - 🔥 Create micro-enterprise (support income generating uses)

Actions to scale up use



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- 🔥 Human Capacity Development
 - 🔥 In-country
 - 🔥 Exchange programs – students and academics
- 🔥 Technology transfer (to increase harvesting of local resources)
- 🔥 Policy support – to translate research outputs into policy
- 🔥 Public Awareness – promotion of clean fuel use and advantages of Renewables

So, what is SANERI doing?



- 🔥 State-funded Research Institute focusing on Public Interest non-nuclear Energy R&D
- 🔥 Established under Ministerial Directive in October 2004, as a company wholly owned by CEF, fully operational in 2007
- 🔥 SANERI has mandate to conduct own research and solicit work from external parties
- 🔥 SANERI's research priorities are guided by
 - 🔥 the draft national energy R&D research strategy (developed by DME, DST and stakeholders)
 - 🔥 the DST 10 Year Innovation Plan.
 - 🔥 SANERI strategic plan stakeholder workshop of 2007.
- 🔥 Supports the membership of SA to various international bodies such as
 - 🔥 IEA Implementing Agreements
 - 🔥 Carbon Sequestration Leadership Forum (CSLF)
 - 🔥 Renewable Energy and Energy Efficiency Partnership (REEEP)
 - 🔥 European Commission Framework Programmes




SANERI's core activities



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Human Capital Development

This is focused on developing skills for non-nuclear energy through postgraduate training and consists of the following programmes

-  Bursary Support Scheme
-  Chairs of Energy Research Programme
-  Hub and Spokes of Energy Programme

Energy Research Programme

SANERI financially supports basic and applied research in institutions of higher learning, research centres, private companies and individuals. The research has to be in line with SANERI's thematic areas and short term research priorities

Cooperative R&D Activities

One of SANERI's objective is to create local and international partnership to leverage funding, research facilities and share knowledge to accelerate technology development and innovation in the thematic areas

Deliverables to Date



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Year	2006/7	2007/8	2008/9
Programme			
Research Chairs	<ol style="list-style-type: none"> 1. Full Chair (Clean Coal Technologies – Wits) 2. Full Chair (Biofuels and Alternative Liquids – US) 3. Assoc Chair (Biofuels and Alternative Liquids – UNW) 4. Associate Chair in Clean Coal (UNW) 		
Hub and Spoke and Centres	<ol style="list-style-type: none"> 1. Renewable Energy and Sustainable Energy (US) 	<p>3 Spokes for Hub</p> <ol style="list-style-type: none"> 1) Wind Technologies (UCT and US) 2) Solar PV (Fort Hare and NMMU) 3) Solar Thermal (UP and US) 	<ol style="list-style-type: none"> 2. Energy Efficiency and DSM (UP) 3. Centre for Energy systems and Analysis 4. Centre for Carbon Capture and Storage 5. Centre or Green Transport
Bursary Support Programme	<p>12 PhD Students</p> <p>15 Masters Students</p>	<p>9 PhD Students</p> <p>18 Masters Students</p>	<p>Budget amounts revised to R100k for PhD and R80k for Masters</p>
Contract Research	<p>43 projects</p>	<p>31 projects</p>	<p>Dependent on budget allocation</p>

SANERI Achievements to date...



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- 🔥 International and Local collaboration
 - 🔥 SANERI is a country representative in a number of the International Energy Association (IEA) Implementing Agreements
 - 🔥 Fraunhofer Institute (Transport division)
 - 🔥 Brandenburg Technical University
 - 🔥 SANERI is the country's National Contact Point for energy research collaboration with the European Union under their FP7 programme
 - 🔥 Royal Danish Embassy and SAWEP (+ 5 partners)
 - Development of updated Wind Atlas for SA
 - 🔥 SANERI is host to REEEP's Southern African secretariat
- 🔥 Research projects beginning to yield results
 - 🔥 A number of SANERI funded research projects are already being presented in international and local conferences.
 - 🔥 A number of technology development projects are ready for prototype development and demonstration
- 🔥 The baseline of energy research outputs in SA has been completed.
- 🔥 SANERI brand matured (local and international markets)

National Energy Act (Act 52 of 2008)



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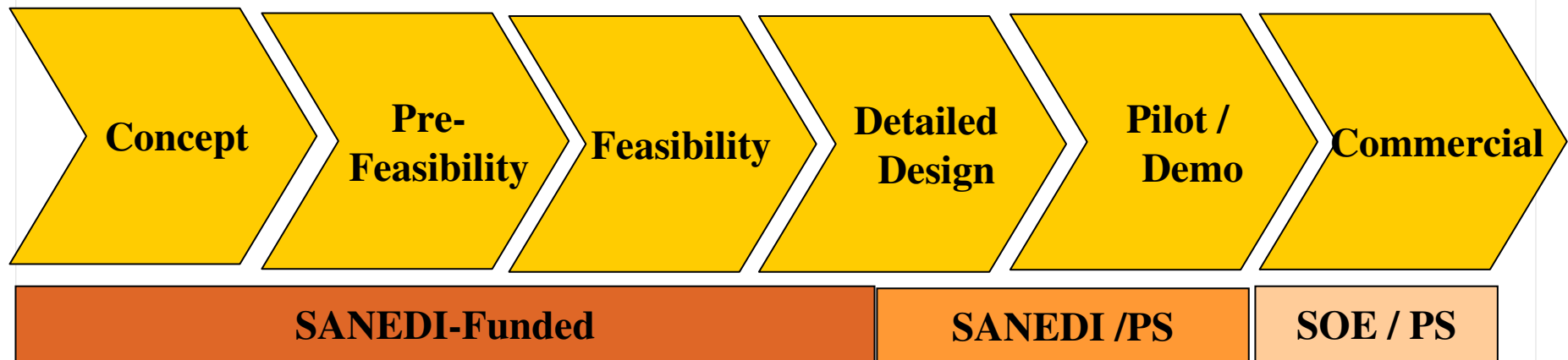
- 🔥 Promulgated as Act 52 of 2008 in October 2008
- 🔥 The Energy Act, 2008 (No.52 of 2008) establishes the South African National Energy Development Institute (SANEDI)
- 🔥 SANEDI has 2 main functions:
 - 🔥 Energy research and energy technology development
 - 🔥 Energy efficiency measures implementation
- 🔥 SANEDI may be viewed as the merger of SANERI and NEEA.
- 🔥 SANEDI strives to bridge the gap between R&D and demonstration & implementation
- 🔥 Through a combination of state, donor and private sector funding it is anticipated that key projects could be accelerated, leading to faster deployment and consequently, more job and local manufacturing opportunities

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SANEDI involvement in project life cycle



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Thank You

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