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South African National Energy Development Institute.

The Renewable Energy Landscape in South Africa

Shaping a Greener Future for the African continent

Van Staden's Wind farm, 27 MW – Round 1 project under REIPP

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ENERGY INNOVATION FOR LIFE

Context

- Urgent need:
  - Reduce fossil fuel dependency
  - Reduce carbon footprint
  - Diversify energy mix and supply
- Solution (no panacea)
  - Renewable Energy (RE) – resources abundant, sustainable, can be quickly implemented, offer work opportunities and have a much lower impact on the environment

Drivers

- Increasing energy equity, reducing poverty and using energy for job creation

- Climate Change
  - Global warming
  - CO_2 emissions

- Energy supply diversification
  - Imbalance of reserves
  - Energy security

Derisking RE in South Africa

- August 1997 South Africa ratified UNFFFC – eligible for GEF funding
- Dec 1998 White Paper on Energy Policy – no Renewable Energy target
- July 2002 South Africa ratified the Kyoto Protocol (non-Annex - developing country), became eligible for CDM
- Nov 2003 White Paper on Renewable Energy Policy - *Target of 10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro- This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW)*
- July 2006 Electricity Regulation Act (No 4 of 2006) – Access to the grid, new generation capacity
- July 2007 Industrial Policy Action Plan (IPAP) 2007 - Implementation of SA's Industrial Policy – incorporates renewable energy

Derisking RE in South Africa cont.

- Feb 2008 UNDP-GEF funded South African Wind Energy Programme (SAWEP) implemented (Wind Atlas for South Africa (WASA) initiated with Embassy of Denmark co-funding, Wind turbine and component IEC standards adopted, Capacity Credit of Wind Generation in South Africa (funded by GIZ) etc)
- May 2008 Darling National Demonstration Wind farm commissioned
- July 2008 Long Term Mitigation Scenarios (LTMS) – Cabinet adopted a peak, plateau and decline trajectory. Emissions to peak between 2020 and 2025, remain flat for a decade, and decline in absolute terms from 2030-35 onwards
- 2008 Energy Act (No 34 of 2008) – establish SANEDI
- 2009 NERSA approved REFIT
- May 2011 Integrated Resource Plan promulgated – 2010 – 2013, 42% (17.8 GW) new built to come from RE (8.4 GW wind, 8.4 GW PV, 1 GW CSP)

Derisking RE in South Africa cont.

- 2011 Legal issues (procurement) with REFIT
- August 2011 Dept of Energy launches RE IPP Procurement Programme – competitive bidding, 70% price, 30% socio-economic development (localisation targets)
- Oct 2011 South African Renewable Energy Initiative (SARI) - Aims to design and facilitate arrangements needed to enable a critical mass of renewables be developed with public, private, domestic and international funding, but without incurring unacceptable incremental cost burdens on South Africa
- March 2012 Deputy Minister of Energy launched WASA Verified Numerical Wind Atlas for South Africa
- Dec 2012 Dept of Environmental Affairs undertook SIP 8: Green Energy SEA initiative for wind (making use of WASA data and tools) and Solar PV – identification of RE development zones (REDZ) - submission for Cabinet approval by 2014
- Mature Renewable Energy Industrial Associations (SAWEA, SASTELA, SAPVIA, SABA etc)

Exploitable RE resources in South Africa

- SA has one of the best solar regimes in the world - most abundant renewable resource in the country (verification underway)
- SA has an excellent wind energy resource (confirmed with WASA project), geographically dispersed allowing for security of supply
- SA has a world-class wave energy resource, predominantly along the south and west coasts
- SA biomass and hydro energy resources are restricted due to limited water
- Energy from waste more readily available and exploitable

RE industry/technology in South Africa

- Wind energy is a mature technology:
  - can be rolled out immediately in SA
  - has the potential to establish a local industry for tower and blade manufacturing in the short to medium term
- Photovoltaic (PV) systems:
  - short to medium term
  - different scales, but large-scale local manufacture of PV cells and modules will be challenging.
- Concentrated solar power (CSP):
  - most promising medium to long term technology for application in SA
  - significant advantages including the possibility of establishing a manufacturing industry.
- Wave energy convertors:
  - still not commercially viable but may have some role in SA in the medium to long term.

Renewable Energy IPP Programme Overview

- The procurement document provided for procurement of 3725MW in five different rounds subject to the availability of the MW
- Pursuant to the Ministerial determination in December 2012, the Minister determined that a further 3200MW of renewables generation capacity was to be procured
- Of the further Ministerial determination, an additional allocation of 308MW was made available for bidding in Bid Window 3 (CSP 200MW, Biomass 47,5MW and Small Hydro 60MW)

- To-date, the Department of Energy has:
  - Under Bid Window 1, entered into 28 agreements on 5 November 2012;
  - Under Bid Window 2, entered into 19 agreements on 9 May 2013.

- With regards to Bid Window 3:
  - Received 93 bids on the 19 August 2013
  - These bids amount to 6023MW whilst the available MW for allocation was 1473MW

The 3rd Bidding Round

- Closed on the 19th of August 2013

- 17 preferred bidders announced 14th November 2013
  - 1 456 MW – 54% Wind, 30% PV, 14% CSP, 1% landfill gas and 1% Biomass

- The round also saw aggressive price decreases across all the technologies with an average of 74 c/kWh achieved for wind down from 1.14 R/kWh in window one, 99 c/kWh for solar photovoltaic (PV) down from 2.75 R/kWh in window one and 1.64 R/kWh for concentrated solar power (CSP), down from 2.69 R/kWh in window one. Introduction of the 'time of day' tariff.

REIPPP Megawatts to Date

	MW in window 1	MW in window 2	MW in window 3	MW remaining
Solar PV	632	417	435	1 041
Wind	634	563	787	1 336
Concentrated Solar Power	150	50	200	200
Small Hydro (less than 40MW)	0	14	0	121
Landfill Gas	0	0	18	7
Biomass	0	0	16	43
Biogas	0	0	0	60
TOTALS	**1 416**	**1 044**	**1 456**	**2 808**

National Biofuels Industrial Strategy

- Drivers: 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

- Over the years, these incentives have proven not to be sufficient to lure investments in the biofuels sector, hence the need to establish a more enabling and supportive regulatory framework.

Biofuels Regulatory Framework

- Biofuels Pricing Framework:
  - Initiated pricing studies (*Blending-value & Break-even price determination*) in February 2011 & completed in December 2011;
  - Finalised the subsidy principles;
  - Drafted biofuels pricing regulations and rules for administering the biofuel prices; and
  - Firming up a biofuels support mechanism together with National Treasury.

- Biofuels Mandatory Blending Regulations:
  - B5 up to B100 and E2 up to E10, promulgated on 23 August 2012 and the final regulations gazetted on 15 January 2014
  - DoE to announce the date of coming into effect of the mandatory blending regulations after conclusion of the support mechanism.

The Biofuels Implementing Committee comprising of oil and biofuels industry stakeholders, chaired by the DOE has been established to address all matters pertaining to the practicalities of blending biofuels into petrol and diesel.

Barriers to Rapid Deployment

- Policy/incentives
- Skills development
- Support for R&D
- Support for pilots and demonstration
- Awareness/market demand
- Development of standards

RE Outlook

- REIPPPP success: Socio-economic development, localisation, job creation etc
- SARI implementation (market certainty)
- Practical RE potential confirmed (ongoing renewable energy resource assessment)
- RE generation Capacity confirmed (issues of intermittency, scheduling growing renewable energy supply)
- Grid availability to evacuate renewable energy electricity generation
- Water usage and availability for power generation (CSP cooling)
- Policy and Regulatory framework for self generation, willing buyer, willing seller, net metering etc (opportunities outside the REIPPPP)

Keep learning by doing!!!

SAIREC 2015

- SA selected as host country for IREC in 2015
- Follows the success of the first IREC in Bonn 2004
- Builds on the success of previous IRECs in countries such as China, USA, India and Abu Dhabi
- Will be global in its scope yet address developmental challenges in SSA and other emerging economies
- Will be held at Cape Town ICC from 4-7 Oct 2015

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THANK YOU

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