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SA Renewable Energy and REIPPPP

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Presented by: Mike Peo – Head: Infrastructure, Energy & Telecommunications

mpeo@nedbankcapital.co.za

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The purpose of this presentation is to provide an update on the REIPPPP and IRP 2010 programs and how both programs are envisaged to be rolled-out.

Introduction

•The South African Electricity Sector has been receiving significant attention over the last 3 years, primarily due to the black-outs experienced in 2008. This situation was rescued as a result of the economic recession, but will resurface soon

•There is a disproportionately big mismatch between the future demand and the current electricity supply in South Africa

•It is clear that Eskom would not be able to continue as the sole monopoly of power generation. Therefore the South African Government is rolling out legislation and a framework to introduce Independent Power Producers (IPP's). The drive to introduce IPP's is further catalysed by Eskom's limited ability to take on more debt to fund generation expansion

•The Integrated Resource Plan 2010 (IRP 2010) is an indication of Government's long term plan to address base load capacity requirements as well as the renewable drive in South Africa and includes Eskom and IPP generation projects

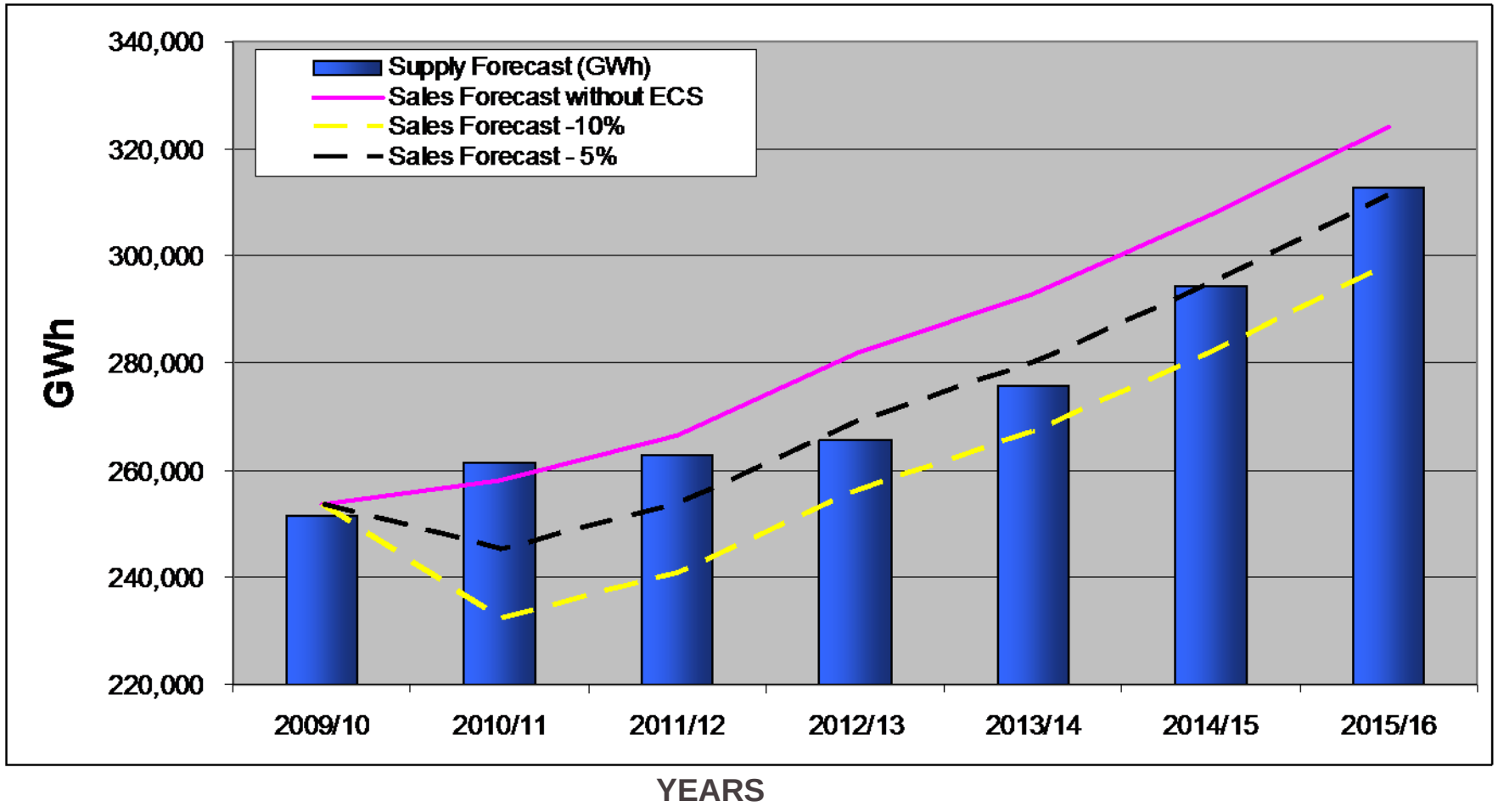
•South Africa has huge potential for renewable power, mainly from wind and solar. This together with the need to reduce Green House Gas emissions from our thermal coal power stations, has motivated Government to launch a Renewable Energy Feed In Tariff (REFIT) program for Renewable Energy.

•The numerous generation project opportunities identified by IRP 2010 and REFIT\REIPPPP will create many investment opportunities for South African financial institutions

Overview of the South African Electricity Sector

CURRENT CHALLENGES	ANALYSIS
• Inadequate generation capacity to meet projected demand growth over next 4 years • Inadequate Reserve Margin leading to load shedding and insufficient time for generation plant maintenance	• High Demand Growth over past few years • Construction of new generation plants started too late and capacity will therefore be constrained until 2013 • New base load power stations take > 5 years to construct and is expensive • IPPs (Co-gen / Renewables) need PPAs and approx 2 years to construct • Reduction in demand is the quickest and cheapest • Supply side management
• Too much reliance on coal based generation, with negative impact on the environment	• Eskom's Carbon Footprint is a major concern • Coal-based generation is, however, the cheapest base load option • Nuclear is a better option (GHG free), but very expensive and less affordable in current financial circumstances (Construction costs vs Operating costs) • Possibility of carbon taxes
• Low electricity price encourages wasteful use	• Pricing signal not strong enough to encourage investment in energy efficient equipment or behaviour • Standard electricity tariff too low to attract investment in alternative generation
• Customers are experiencing an increase in electricity costs	• Electricity price increases are inevitable due to increased generation cost • The only way to counter price increases, is by reducing consumption through increased efficiency
• Inadequate electricity price increases have lead to increased risk to the Eskom New Build Programme	• Eskom may have to delay new power stations due to cash flow challenges • Reduction in demand will have positive impact in reducing risk of power outages and the cost to the consumer • Possibility of Power Conservation Programme (PCP) penalties

Current South African Electricity Landscape



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Current Demand and Supply Overview

Supply Side Overview

- 27 Operational Power Stations
- ~40.7GW of Eskom operational capacity
- Just over 80% coal-fired. Mix of nuclear, open cycle gas turbines, hydro and pumped storage plant in remaining 20%
- Imports of about 1500MW mainly from Cahora Bassa
- Returned 2 mothballed coal fired stations, building 2 coal fired and a pump storage station
- Total operational country capacity of ~43.5GW

Demand Side Overview

- 29% of South Africa's energy demand provided by electricity
- Forecast of about 37.2GW peak demand in 2010
- Largest 138 industrial customers consume nearly 40% of the energy
- Largest 40 000 customers consume nearly 75% of the energy
- Approximately 8 million residential customers consume about 20 to 25% of the energy

Future Generation Requirements to Meet Expected Demand

- South Africa needs to create more than 50GW of new electricity capacity by 2030 – more than doubling the current capacity of ca. 43.5GW
- South Africa needs to take urgent action in order to ensure security of supply for the country for the next 20 years
- In the scenario where the most likely risks realise, there will be two periods in the next 20 years when the risk of supply interruptions significantly increases in South Africa: from 2011-2013, and then again from 2018-2024
- Current expansion plans are based on the moderate growth scenario (averaging 3% electricity consumption growth rate over a 20 year period). It is important to understand the impact of changes in energy utilisation patterns. Every 1% of GDP growth requires 0.75% increase in electricity supply
- In order to power the South African economy and ensure an adequate reserve margin, 20GW of additional generation capacity is required by 2020 and an additional 30GW by 2030. This includes the decommissioning of 10GW of existing capacity (from 2023 onwards)
- IRP 2010 is the proposed master plan to address the generation challenges faced in South Africa

SA Government Intervention : Integrated Electricity Recourse Plan 2010

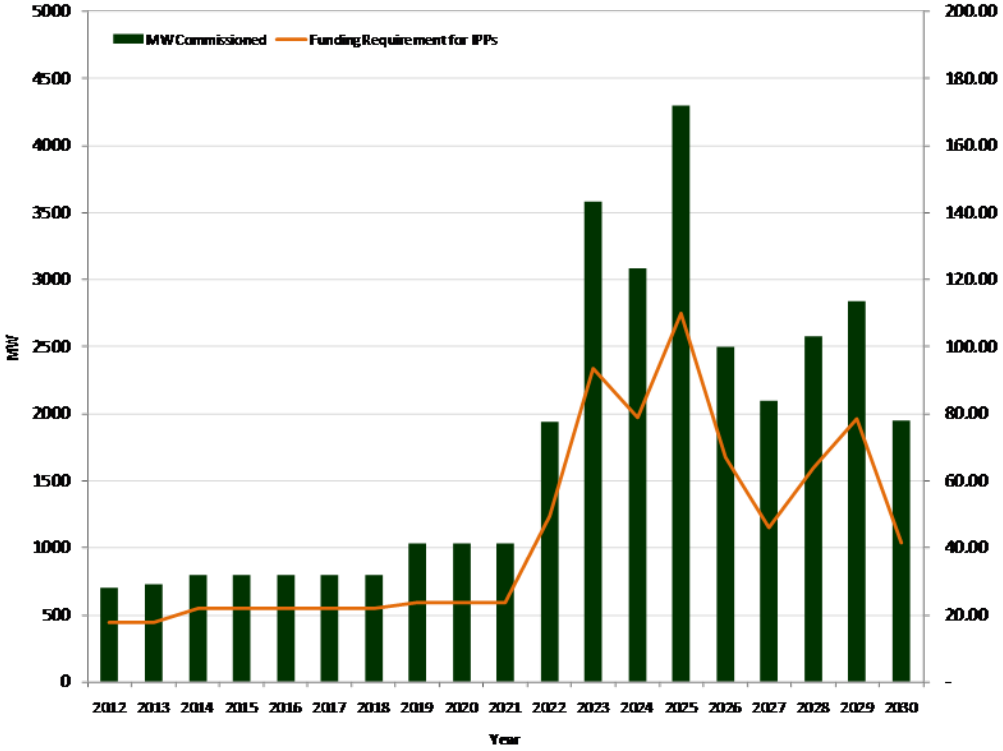
IRP 2010 sets the road map for Eskom and Independent Power Producers

- DOE has released the draft IRP 2010 for the South African revised electricity supply scenario for the period until 2030
- IRP 2010 has concluded that for the next 20 years, South Africa would need an additional 52 248 MW of new electricity generation capacity to support an average gross domestic growth of 4.6%
- South Africa is the 11th highest emitter of carbon in the World. The DOE has signalled a carbon emission reduction in the long term by substituting fossil fuel with both renewable and nuclear energy. The IRP 2010 also aims to achieve this
- **The DOE has estimated that this new capacity would require an additional R790 billion in capital expenditure**

South Africa's Current and Future Electricity Mix		
Technology	**Current Electricity Mix**	**IRP 2010 total Electricity Mix (2030)**
Baseload Coal	84%	48%
Baseload Nuclear	4%	14%
Renewable Energy (dispatchable)	0%	16%
Peaking Open Cycle Gas Turbine	4%	9%
Peaking Pump Storage	3%	6%
Mid-merit Gas	2%	5%
Baseload Import Hydro	3%	2%

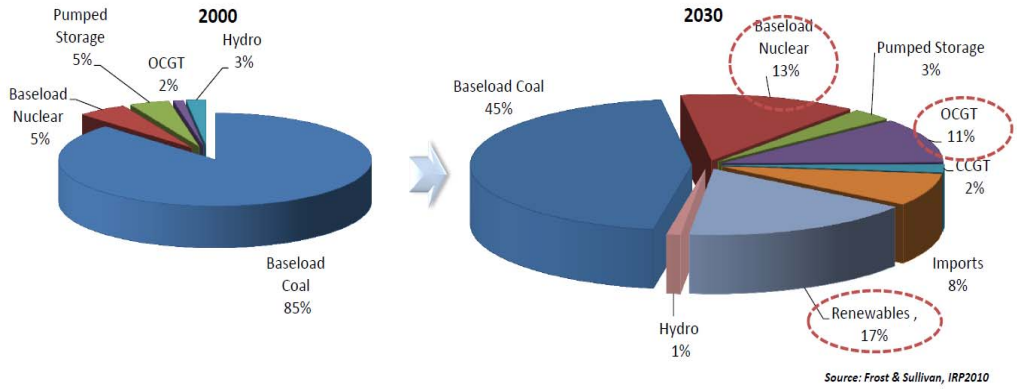
- This means 33% of all new build will be Renewables, 25% Nuclear, 9% Coal. Of the Renewables, 4.5GW will be allocated to wind (600MW by 2019)

Integrated Resource Plan (IRP2010) Commissioning Schedule



	Total generating capacity in 2030		Capacity added through IPPs by 2030	
	MW	%	MW	%
Coal	41,074	45.9	-	0.0
OCGT	7,330	8.2	-	0.0
CCGT	2,370	2.6	2,370	7.1
Pumped Storage	2,912	3.3	-	0.0
Nuclear	11,400	12.7	9,600	28.7
Hydro	4,759	5.3	2,609	7.8
Wind	9,200	10.3	9,100	27.2
CSP	1,200	1.3	1,200	3.6
PV	8,400	9.4	8,400	25.1
Other	890	1.0	125	0.4
Total	89,535	100	33,404	100

Current Energy Mix | **Proposed Energy Mix**



Source: Frost & Sullivan, IRP2010

- Substantial funding requirements over the medium to long term
- Commercial Banks to lead the initial funding requirements for IPPs in SA – ECA participation to increase over time
- Energy Team is well positioned to be a leader in the debt funding for the IPPs

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History of REFIT (Renewable Energy Feed-In Tariff)

November 2003

- White Paper on Renewable Energy
- 10,000 GWh by 2013
- 4% Renewable Energy to make up total generation

December 2008

- NERSA REFIT Consultation Paper

March 2009

- NERSA REFIT guidelines gazetted, including tariffs

July 2009

- NERSA REFIT consultation paper including new technologies and PPA
- Tariffs for Phase 1

August 2009

- New Generation Capacity Regulations under the Electricity Regulation Act, specifically envisaging a REFIT bid programme

January 2010

- Integrated Resource Plan - IRP1 (Draft)
- 16% Renewable Energy to make up total generation

February 2010

- NERSA Selection Criteria
- NERSA Cost Recovery Mechanism

March 2011

- Unexpected review of Renewable Energy Feed-In Tariffs

May 2011

- New Generation Capacity Regulations – only IPP bid programme
- Integrated Resource Plan - IRP 2010 gazetted
- 17,800 MW allocated to renewable energy
- ISMO Bill
- Energy Minister confirms original REFIT tariffs apply

June 2011

- **Contradictory statements from National Treasury and Department of Energy on whether or not IPP procurement would follow a REFIT or a competitive bid programme created confusion in the market**

REIPPPP

- In March 2011, approximately 1 month prior to the DOE and Treasury releasing the RFP for the procurement on the first round of REFIT Projects, the Energy Regulator issued a notice to revise the tariffs published in 2008. (The reduction is as much as 40% on certain technologies.)
- During the public hearing, many major international developers expressed their frustration and disappointment. Presenters informed the Regulator of their intention to disinvest from the South African projects as the return on these projects no longer met their hurdle rates.
- NERSA published the revised tariffs in July 2011.
- REFIT RFP changed to REIPPPP and the RFP was published on 4th August 2011.
- The RFP required competitive bidding on the tariff, there are very mixed views in the market on this potential change.

REIPPPP PROCESS

- Pursuant to the IRP 2010 plan of introducing Independent Power Producers ("**IPPs**"), specifically for the supply of renewable energy to the grid, DoE initiated the procurement program for renewable energy and published the REIPPPP RfP in August 2011.
- The RfP sets out the following specifics, *inter alia*:
- Instead of 1025MW being procured (as originally intended), the Minister more than tripled the required capacity, announcing that 3725MW is to be procured under REIPPPP. There are 5 bidding 'windows' under which developers can submit bids for their projects to be awarded "**Preferred Bidder**"" status:
  - 4 November 2011;
  - 5 March 2012;
  - 20 August 2012;
  - 4 March 2013; and
  - 13 August 2013.
- These are referred to as the "**Bid Dates**".
- There are a number of renewable energy technologies available and the allocation for procurement is broken up between them as follows:
  - Wind – 1850MW;
  - Concentrated Solar Power ("**CSP**") – 200MW;
  - Solar Photovoltaic("**PV**") – 1450MW;
  - Biomass – 12.5MW;
  - Biogas – 12.5MW;
  - Landfill Gas – 25MW;
  - Small Hydro (less than 10MW per project) – 75MW; and
  - Small Projects (1MW-5MW), using any of the aforementioned technologies – 100MW.
- If the maximum allocated MW for any particular technology has been filled during any particular Bid Date, the subsequent Bid Dates will not be open for that particular technology. For this reason, there is massive urgency in the market for developers to submit their projects as soon as is possible.

REIPPPP PROCESS

•Selection of projects will be by way of a competitive bid process and the following tariffs(i.e. the price a project will be paid by Eskom for the power it supplies), will apply as a cap to the tariff bid:

- Wind – R1 150/MWh;
- PV – R2 850/MWh;
- CSP – R2 850/MWh;
- Biomass – R1 070/MWh;
- Biogas – R800/MWh;
- Landfill gas – R600/MWh; and
- Small hydro – R1 030/MWh.

•All information contained in bids submitted, including Banks' funding commitment, must be valid for three hundred days from the Bid Date (or such longer period as DoE requires). The selection process for all bids submitted at a particular Bid Date,are divided into two main phases – Qualification and Evaluation.

•Under the Qualification phase, the bid will be assessed against specific qualification criteria stipulated in the RfP, which are broadly categorised as follows:

•project structure;

•legal requirements;

•land acquisition and use;

•environmental compliance (specific to each technology);

•financial criteria (including tariff, financial standing and experience of project parties, robustness and deliverability of the funding proposal, and robustness of the financial model);

•technical requirements (including compliance to international standards); and

•economic development criteria (SA entity participation, BBBEE contribution status, compliance with an 'Economic Development Scorecard').

REIPPPP PROCESS

- The threshold requirements of each qualification criterion is stipulated in the RfP. Failure to achieve any of these “gatekeepers” will result in the bid being categorised as ‘non-compliant’ and automatically rejected. Developers will stand to lose their bid bonds (R100000/MW) in the event that they submit non-compliant bids.

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REIPPPP PROCESS

- If, after the Qualification phase, a bid is found to be ‘compliant’, the bid is then evaluated against stipulated Evaluation Criteria. The two main criteria are tariff and economic development. These two criteria are allocated a weighting in evaluation of 70% and 30% respectively. Tariffs will be determined on a like for like basis, (benchmarked against the lowest compliant bid’s tariff), whilst in respect of economic development, a scorecard has been formulated, enabling the department to determine bidders’ commitment to economic development requirements.
- Each technology has its own economic development matrix, but common to all are the criteria of job creation, local content (with special emphasis on local manufacturing), rural community development, skills development and education, enterprise development, socio-economic development, and participation by the historically disadvantaged.
- Bidders whose responses rank the highest will be appointed Preferred Bidders, with as many being appointed as may be necessary in order to provide the maximum allocation of MW for each technology, at the discretion of the DOE. In the event of selection, a Preferred Bidder will be obliged to comply with the price and economic development proposals in its bid, with regular reporting to demonstrate compliance during the life of the project.
- Non -compliance will result in progressive demerits, and perpetual or sustained non-compliance may eventually result in cancellation of the PPA. compliance during the life of the project. Non-compliance will result in progressive demerits, and perpetual or sustained non-compliance may eventually result in cancellation of the PPA.
- The PPA, IA, DA and CA are all non-negotiable, although DoE reserves the right to revise any of the mat any time prior to Financial Close.
- Each Bid Date is tied to specific milestones.
- For the first Bid Date, Preferred Bidders will be announced on 25thNovember 2011 and the deadline for then reaching Financial Close is **19thJune 2011**.

Renewable Energy for South Africa

The South African government has committed to produce renewable energy as part of national supply

These *feed in tariffs are close to the international benchmarks. They have attracted significant attention from IPP developers, many of whom have commenced development work*

- The Renewable Energy Feed in Tariff scheme in South Africa is generally referred to as REFIT now changed to REIPPPP
- South Africa has very good potential for wind and solar power generation. To a lesser extent, landfill gas and small hydro generation is possible. Wind has the largest allocation
- The Renewable Energy target for REIPPP is 3750 MW, which is less than 8% of total generation. This will increase in following phases as per IRP 2010
- In 2009, Eskom's average selling price was R0.33/kWh. NERSA approved a 24.8% increase for 2010/11, 25.8% for 2011/12 and 25.9% for 2012/13. Therefore with these exponential increase, RE will not be as expensive as initially contemplated

Main Large Scale Renewable Technologies

No commercially funded renewable project has been closed in South Africa to date.

Wind

- **A mature technology.** Global wind capacity is over 150 GW.
- **An increasingly affordable energy alternative.** Wind energy production has reduced in cost by around 50% over the past 15 years as turbines have increased in size and height and efficiency has improved.
- **Some cost reductions achievable through scale** of projects, but although ongoing development is continuing in turbine design and material, learning curve is flattening out.

Source: Global Wind Energy Council

Concentrated Solar Power

- **An emerging technology**, established commercially since 2006. Global capacity installed to date is 1 GW with 15 GW worth of projects in development.
- **Becoming competitive.** In the sunniest countries, CSP can be expected to become a competitive source of bulk power in peak and intermediate loads by 2020, and of base-load power by 2025 to 2030.
- **Provides base-load power.** The possibility of integrated thermal storage and fuel-power backup is an important feature of CSP plants

Source: Deutsche Bank (2009) The CSP industry: An awakening giant

Concentrated Solar Power (CSP) Technology Options

South African climate is ideal for solar power generation

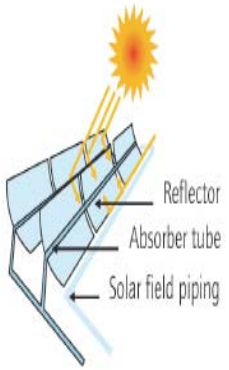
Conventional photo voltaic (PV) generation is still very expensive at $6,8 million/MW

CSP uses mirrors to concentrate sun light, heating a liquid; the liquid exchanges heat with water at high enough temperatures to drive a conventional steam turbine

CSP creates more jobs (to clean the mirrors) than any other RE technology. This is a very positive consideration for rural communities with high unemployment

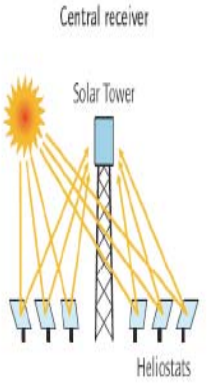
Although solar is relatively expensive, South Africa is very suitable and the potential capacity is huge

Parabolic trough



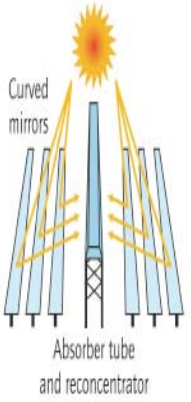
- Most mature: account for the largest share of the current CSP market.
- Most existing plants have no thermal storage and rely on combustible fuel as a backup.
- Proven technology: evidence of costs from established 50MW plants.

Tower



- Extremely high temperature, increased efficiency, reduced cost of storage and better capacity factors.
- Still to be scaled up. Evidence of costs is only from Current plants are 10MW.

Linear Fresnel



- Simple design, lower investment costs.
- Less efficient than troughs or towers. difficult to incorporate storage capacity.
- No large plants developed yet. Evidence of costs is only from 5MW installations.

Parabolic dish

- Highest solar to electricity efficiency option.
- Low water use.
- Harder to incorporate storage, not a base load option.

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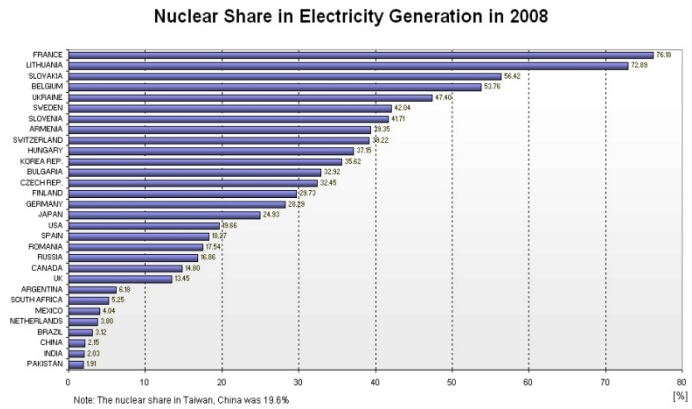
5000 MW Upington Solar Park

- South African Government has recently announced the 5000MW Upington Solar Power project in the Northern Cape province
- This would be an utility scale solar park, in which the Government will provide the necessary infrastructure such as roads and grids, and the IPP would be responsible of building, owning and operating the solar power station
- Should the project be developed, it could involve a capital investment of R150 billion over a 10 year period. It will contain all Solar technologies
- A prefeasibility study has been undertaken by the Clinton Climate Initiative and the DOE. The final feasibility study is being conducted
- A research and development programme will also be established in the Park
- Eskom will be responsibility for the grid infrastructure
- Water will be allocated from the Orange river
- The Solar Park is expected to be included in the final IRP 2010 and is separate from REFIT

Nuclear Power Generation in South Africa

- Nuclear power generation has the following advantages for South Africa:
  - Green House Gas (GHG) free baseload alternative;
  - Does not require any fresh water for cooling and can desalinate sea water during the evening. Coal-fired power generation uses ± 1400 litres per MWh (33,600 litres per MW per day);
  - Strengthens and stabilises the transmission grid in coastal regions;
  - Limits transmission losses from inland generation to coastal regions (up 30% losses);
  - Low generation and continual operating cost;
  - Long operational life (more than 60 years, some 80 years);
  - Proven and highly regulated safety, from generation through to spent fuel storage;
  - Insensitivity to fluctuations in fuel price (vs uncertainty around future cost of fossil fuels); and
  - A nuclear fleet programme could lead to a localisation programme and up to 50 000 direct jobs (up to 7x multiplier for indirect jobs).
- Equator principle do not discriminate against Nuclear technology
- Some of the negative factors associated with nuclear power generation includes:
  - High initial build (capital) costs;
  - Market perceptions; and
  - Significant regulatory costs



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Co-generation Programme

- Introduced in 2007, involves the production of decentralised energy from waste fuel or process energy
- Designed for existing industrial plants that have a fuel source that is currently being flared or lost
- Co-generation has been identified as a means of delivering potential energy efficiency, and has definite environmental and social benefits
- Eskom aims to procure 1143 MW to 3000 MW of commercial cogeneration electricity in the medium term for a period up to 25 years
- The 25-year duration is aimed at supporting project finance arrangements. Debt funders would need to seriously consider acceptable tenors for corporate off-takes
- With the increase in the electricity tariffs, these projects have now become more feasible
- The following table indicates the potential co-generation capacity that exists

Industry	Additional Potential	Remarks
Sugar industry	150 – 200 MW	Blue sky potential of 1000 MW
Oil refining industry	150 – 250 MW	Often developed in-house
Synthetic Fuels Industry	400 – 800 MW	280 MW in process, a further 100 MW possible, rest only after 2012
Iron and Steel	100 MW	Often developed in-house
Food processing	75 MW	Small projects often developed in-house
Pulp & Paper	Not determined	Blue sky potential of 200 MW
Waste industry	Not determined	Blue sky potential of 500 MW

Base Load Captive Power Projects

- The security of electricity supply and exponential electricity price increases have lead to many members of the intensive electricity consumers group to consider alternate self generation/captive power stations. The Power Conservation Program (PCP), in which Eskom intends cutting up to 10% of the electricity supply to these intensive electricity groups, has further supported the need to access alternate generation
- Many of the senior mining companies such Anglo (450 MW) and Xstrata (300 MW) are conducting feasibility studies on the construction of captive power stations using their discard coal as a fuel source
- Sasol has also indicated that they are planning a 800MW gas fired plant in Secunda to meet their power requirements
- Transmission of this power remains a challenge as entities may have to conclude wheeling agreements with Eskom
- IRP 2010 has confirmed Government's intention to further develop the country's Nuclear capacity to provide base load power, thus providing security of supply. This may influence the final investment decisions on captive power plants

DOE Peaker Plant

- GDF Suez has been awarded the tender to build, own and operate two open-cycle gas turbine (“OCGT”) power stations with a combined capacity of 1000 MW, operating as peaking plants, consisting of one plant located in the Eastern Cape province (capacity of 288-382 MW) and a second plant in Kwa-Zulu Natal province (capacity of 684-764 MW)
- DOE has resolved all of the procurement issues
- This project is expected to lead the establishment of the IPP sector in South Africa
- The PPA is expected to have government support
- The fuel price risk is expected to be a pass through cost to the DOE
- The book building exercise is expected to commence in December 2010

Carbon Credits

- Renewable energy projects generally qualify for carbon credits. Debt financiers ignore the cash flows from carbon trades, due to the uncertainties on the extension of the Kyoto protocol post 2012
- The general trend is that Developers/Sponsors secure the carbon arranging mandate long before they engage with the debt financiers. Therefore, debt financiers have no influence in persuading the developers as to who they contract regarding the carbon credits
- Carbon credits forms part of the early Developer/Sponsor equity up side, mostly secured by the parties that contribute to the development funding of a project and is, therefore an equity play