Towards a sustainable and affordable electricity plan for South Africa

Presentation to Department of Energy and IRP 2010 Stakeholders

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About Quartile Capital

- Quartile Capital is a niche services and investment company, focusing on corporate finance, treasury services and principal investments
- Some of our successful projects:
  - Afrisam buy out of Holsim – BEE advisor (R16 bn)
  - Rand Water – Strategic funding plan (R5 bn)
  - National Treasury - bond raising advisor (US$ 2bn)
  - MTN BEE transaction - lead advisor (R25 bn)
- New work in the energy, clean tech and carbon efficiency sectors
  - research and strategic consultant
  - corporate advisor to raise capital for REFIT qualifying projects
  - investor and strategic partner
- Current research and projects on solar, biomass, waste to energy and small hydro
  - Technological reviews
  - Feasibility studies
  - Project costing and business planning
  - Regulatory, policy and market analysis

Systemic issues for a 20 year plan

- **Power a necessary condition to growth and development.**
  - Lifeblood of energy intensive mining and resources industries, fledgling manufacturing sector
  - Residential use and electrification (and importance for education and health)
  - Essential for a modern, commercial and information economy
- **Changing market structure**
  - Delivery model: state monopoly, private utilities open market, or a hybrid market
  - These will effect the nature of the technology mix, power prices and capital costs
  - Investment decision: based on national strategic interests, return / risk, need to be expanded to include sustainability, fully reflect costs, and be strategic and economically prudent
  - Market failure : to ensure security of supply, inadequate funding sources
- **Full costs and benefits**
  - Direct financial costs of new power generation (capital and operational costs)
  - Environmental (including water use and pollution, air pollution, and carbon intensity)
  - Socioeconomic advantages and opportunity costs (including effect on jobs, industry growth)
- **Other total system issues**
  - Energy efficiency (on the supply, transmission/distribution and demand side)
  - Household energy can be much more efficient, water heating, heating, cooking
  - Cogeneration, localisation of supply, and wheeling to match local supply and demand
  - Cross border sales (imports and exports) – offers diversification of supply and demand

Business as usual

aka “keeping the lights on”

Eskom new build assets

Medupi, Kusile, Coal3

< 2% renewables

+- R500bn later

+- 572% increase in KWh price within in 20 yrs (10% pa)

If that’s required ok, except…

The elephant in the room is:

a future carbon price:

- Tax or ‘cap n trade’ in 5 yrs
- R100-R750 / ton proposed
- Coal assets become liabilities
- IRP2010 must include this risk into its base case model

Our view on the road ahead – supply options

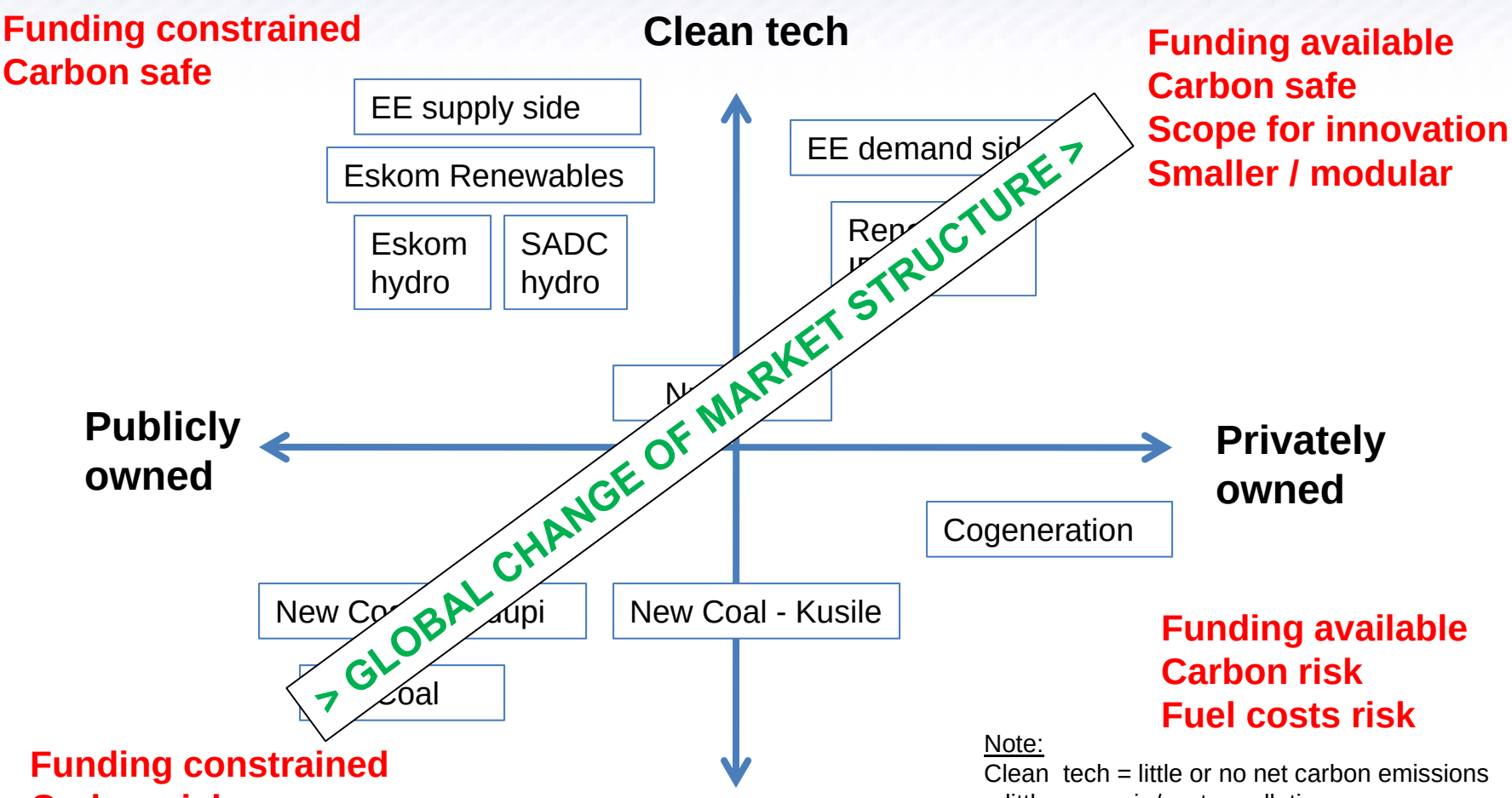
- There is an inevitable shift to a low carbon economy
- This is going to be expensive and disruptive of established industries / supply systems

- A low carbon path will mean either:
  - **Renewables**
  - **Nuclear**
  - **Coal/gas with carbon capture and storage** (for thermal power and also for CTL)
  - **Cogeneration** and **energy efficiency** measures (reduce demand, unlock supply)

- The timing and combination of thereof is yet to be determined – IRP2010, IRP2013 etc
- Key and reasonable criteria need to be established to guide this determination
  - Propose these are simplified to financial costs, broad costs and risks, opportunity costs
  - Need to be clear and communicated and cannot only be done by a computer model

- Supply choices relative merits and risks will need to balanced
  - Ultimately a policy / political question (of trade offs and available resource)
  - Must be informed by evidence based science, credible data and transparent process
  - Must be sustainable ie. in the interests of current and future generations

Thinking through the road ahead – supply options



Funding constrained
Carbon safe

Funding available
Carbon safe
Scope for innovation
Smaller / modular

Funding available
Carbon risk
Fuel costs risk

Funding constrained
Carbon risk
Fuel costs risk
Mega projects

Note:
Clean tech = little or no net carbon emissions
= little or no air / water pollution
= little or no toxic or nuclear waste
EE = Energy Efficiency measures

Analysing the range of costs

1. What is the **direct financial cost**?
- Capital costs (per MW)
- Operational costs (includes O&M and fuel costs)
- Levelised costs (includes above and cost of capital)
- Lead times
- Construction and contract risk

2. What are **the broader environmental, and social and economic costs and risks**?
- Carbon costs
- Air pollution (and potential health risks)
- Water intensity
- Water pollution
- Nuclear waste (long term liabilities)

3. What are the **opportunity costs and benefits**?
- Job creation
- New industry creation
- Competitive / non-competitiveness of exports

- All of these costs need to be quantified and make explicit.
- Where there are no parameters they need to be added eg. coal, jobs, lead times.
- The computer model is not an exhaustive tool, but is a first step in a more important decision making process, which requires detailed expert input and broad consultation
- Current direct costs biased to large mega – projects (per MW basis), while advantages of smaller / modular plants not captured.
- Proposed capex and levelised costs need to be reviewed, US-based and may be outdated
- Some of the broad risks are non-negotiable
- As a developmental state some economic objectives trump direct financial costs

Factors influencing direct costs

S5 - Exchange rates

- Assumes very weak Rand
- Discriminates against technology classes with more imported components and against technologies with high capital costs relative to levelised costs
- Propose **more realistic rates**
- More conservative rates may be applied to long term levelised costs and fuels

	Parameter	Actual (7/6/2010)	Propose
US $: R	9.50	7.78	8
Euro € : R	13.18	9.31	11

S? – Lead times, contract and construction risk

S3 - Discount rate

Cost of equity	7.3 %
Cost of Debt	10.6 %
Pre-tax WACC	10.3 %

- Very optimistic Eskom Cost of Capital
- IPP Costs of Capital will have to attract higher returns (CoE) to attract investment
- Debt will be significantly risk related
- Different capital costs for different
  - Technologies
  - Funders and funding classes
  - Shareholders
  - Project lifespans
- **Both debt and equity cost will change for public and privately owned projects**
- IRP2010 needs to reflect to model both
- 1998 white paper commits to 30% IPPs

SA context – benefits and opportunity costs

- The scale of investment and industrial path implications of a 20 year plan are too important to not consider a range of key economic benefits (other than power supply)
  - **Job creation**
    - Number of direct jobs created in construction
    - Number of direct jobs created in operations and maintenance
    - Number of jobs created in supply industries
    - Mean income of direct employees
  - **Skills transfer**
    - Numbers of recruits from tertiary institutions into sector
  - **New industry development**
    - New companies registered
    - Tax income from IPPs
  - **Competitiveness / non competitiveness of imports**
    - Relative carbon intensity of products per unit
  - **Localisation of supply and service industries**
    - Degree of local components, goods and services
    - Integration with IPAP2, procurement and other government policies

Conclusions – IRP2010 – Feel it! It is Here!

- **System wide issues**
  - Changes in market structure, and enabling for IPPs, Cogen and EE
  - Decentralised and local interventions
- **Low carbon path**
  - SA carbon price needs to be factored
  - IRP2010 must talk to NT's plans regarding a carbon price
- **Unbiased scrutiny of supply options**
  - Need to be evaluated in an unbiased and transparent way
  - Three kinds of costs to be carefully considered and ranked in priority
  - Issues on direct costs- discount rate, exchange rate, lead time risks
- **Opportunity / opportunity cost of new energy path**
  - Global environmental and climate change leadership
  - Job creation, foreign investment, and industrial development
- **On the IRP2010 process**
  - Should be thorough, not rushed, be a genuine and transparent process
  - Make use of range of sector experts in key areas to get broad agreement
  - Needs be guided by renewable energy white paper and NT carbon tax proposal
  - Should to be completed this year, can be reviewed in IRP 2013