Governing electricity: from monopoly to market? the case of South Africa

IEA workshop: the Role of State-owned Enterprises in the Low-Carbon Energy Transition

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Eskom in context

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- **Electricity sector controlled by state-owned monopoly utility, Eskom**
- **Primary generator, sole transmitter of electricity and is responsible for 60% of distribution *(Municipalities are responsible for 40% of distribution)***
- **Installed capacity of approx. 42 GW (but ageing units)**
- **92% of SA's electricity production is coal-fired**
- **Highly coal-dependent and carbon intensive. Historical dependence on abundant low-cost coal**
- **37% of Eskom's sales to 31 energy intensive users**
- **Residential consumption approx. 20%**
- **Long-standing resistance to the liberalisation of the electricity sector**
- **Regulatory framework for renewable energy from IPPs introduced in 2011**

Eskom generation mix 2016

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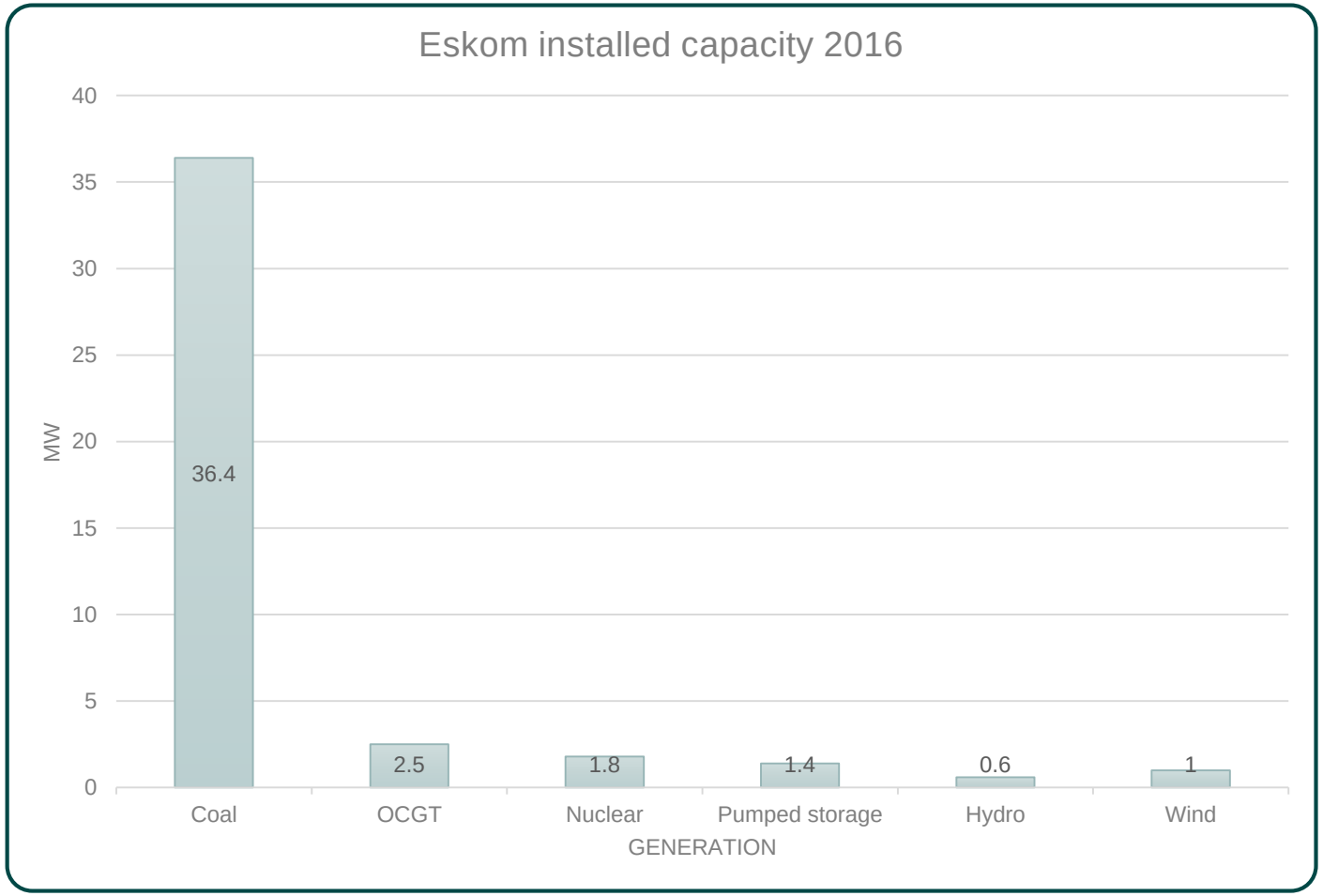

Source: Eskom 2016

Recent shifts: future of Eskom?

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- Electricity master plan (2011) allows for approximately 20% (17.8 GW) of installed generation capacity from renewable energy. This will produce approx 9% of electricity supply
- Eskom faces a supply-side (reserve margin less than 15%) and financial crisis
- Latest symptoms of crisis: load shedding in 2006/8 and 2014/5. Electricity supply stabilised in 2016
- SA has gone from some of the cheapest tariffs in the world in 2008 to 250% increase by 2015. But still below ‘cost-reflective’ levels
- Cheap and abundant coal-based trajectory no longer sustainable
- Climate change commitments: Copenhagen pledge 2009.
- Nature of economic growth has changed: services and finance much more significant (24% of GDP). Decline in commodities market and therefore energy demand.
- Introduction of renewable energy generation from IPPs (just over 2% of supply)
- Installation of roof-top solar PV has increased significantly since 2014

Electricity policy: complexity of actors and processes

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- **Apartheid era policy making on energy and electricity planning highly secretive and largely Eskom's domain**
- **2009 Department of Energy (DoE) established (Baker et al 2015)**
- **DoE responsible for policy, but lacks capacity and resources**
- **Therefore electricity planning generally carried out by Eskom**
- **DPE is Eskom's governmental shareholder (*as for all parastatals*). Eskom was corporatised in 2001**
- **Treasury looks at financial exposures of Eskom**
- **Regulator (NERSA), determines tariffs, approves generation licences. Reports to energy minister: the 'activist regulator',**
- **Departmental tensions, mandate clashes, lack of transparency (Baker et al 2015)**
- **IPP-Unit (established 2011) manages procurement of IPPs**

Ideological tensions: from “state to market and back again” …

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- Eskom avoided the ‘standard model’ of power sector reform (Gratwick and Eberhard 2008, Eberhard 2005)
- Attempts to liberalise power sector in 2000s in South Africa failed
- Attempts to set up an independent systems operator have failed
- Ideological tensions within the ruling party (ANC) between a liberalised electricity market and attempts to hold on to state-owned, state-run monopoly
- Centralised grid electricity has primacy in South African energy policy at multiple levels and under a national paradigm that has been described as ‘big coal, big networks, big nuclear’ (Eberhard 2013)

Renewable energy in South Africa

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- **SA a leading global destination for RE investment since launch of renewable energy independent power producers' procurement programme (RE IPPPP), 2011**
- **Utility-scale renewable energy connecting to centralised grid (wind, solar PV, CSP)**
- **13 GW of capacity allocated, of which over 6 GW (92 projects) contracted**
- **42 projects (approx. 2 GW) connected by mid-2016 (approx 2.4% of supply)**
- **Total private investment commitments of approx $19 billion Rounds 1 to 4 (Eberhard & Kaberger 2016)**
- **Renewable industry responsible for approx 30% of all FDI into the country**
- **RE is bringing new forms finance, technology supply, new constellations of national and international actors**
- **RE is now competitive with new baseload coal: *Medupi estimated 97 cents per kWh v. Round 4 tariffs 62 cents per kwh for wind; 79 cents for solar PV***
- **'Green economy' (New Growth Path, Industrial Policy Action Plan, National Development Plan etc)**

Renewable energy in South Africa

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- Competitive bidding process
- 20 year government-backed power purchase agreement
- Eskom's role reduced to buyer of power
- 'Take of pay' contracts: all electricity generated is taken and paid for
- IPPs pay for connection, but Eskom responsible for grid strengthening
- Projects are scored 70% on tariff and 30% on economic development criteria (e.g job creation, local content, rural development, BEE)
- Increasingly competitive: drop in electricity tariffs submitted in nominal terms: 71% in PV; 46% in wind

Droogfontein solar power plant source: www.energyblog.org.za

Tariff decrease: Rounds 1 to 4

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Tariffs	Round 1 bid cap (per kWh)	Round 1 average bid (per kWh)	Round 2 average bid (per kWh)	Round 3 average bid (per kWh)	Round 4 average bid (per kWh)
Wind	R1.15	R 1.14	R 0.90	R 0.66	R0.62
Solar PV	R2.85	R 2.76	R 1.65	R 0.88	R0.79
CSP	R2.85	R 2.69	R 2.51	R 1.46	

Renewable electricity generation (2015)

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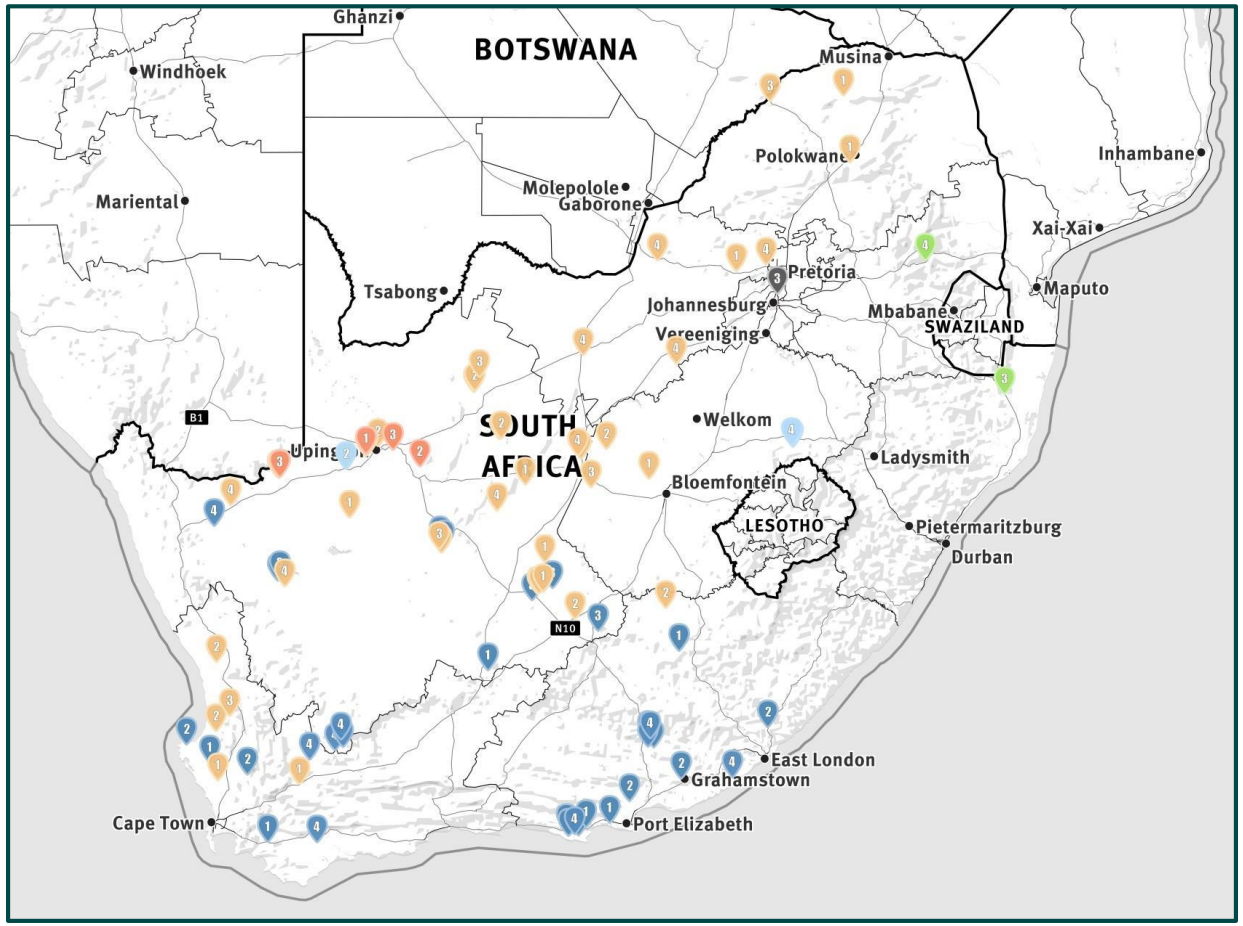

Source: www.energyblog.co.za

RE IPPPP

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- **Despite its successes, the highly competitive nature has raised concerns over tight contingencies**
- **Tensions between international ownership of the industry v. national priorities for local ownership, and economic and community benefits**
- **Eskom's resistance posing a threat to investor certainty**
- **RE IPPPP has paved the way for an IPP programme from coal and gas…**

Key challenges to the low-carbon transition

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- **Transmission challenges: technical, political and financial. Additional capital needed for grid strengthening. Eskom has redirected capex to its own generation capacity expansion programme**
- **RE IPPPP has led to a procurement programme from IPP coal: request for proposals launched in 2015 (2.5 GW) and a potential gas IPP programme, details unclear**
- **In July 2016 Eskom announced it will not sign any new PPAs with IPPs beyond those selected in Round 4.5 of RE IPPPP. Decision justified on basis of improved availability of energy supply. Claims that IPPs cost more than older plant**
- **Eskom acting beyond mandate**
- **Request for proposals for a 9,600 MW nuclear programme to move forward on 30 Sept 2016. Being pushed by the Presidency with assistance from DoE and tacit support from Eskom: *Who builds? Who pays? Who owns? How much? !!***
- **Growth of roof top solar PV is ahead of regulatory framework**

Conclusion

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- **South Africa's experience illustrates the challenges of managing the low-carbon transition in electricity**
- **Understanding the political economy of the country in question, the role of vested interests and international influences at play is crucial *(historical perspective)***
- **Eskom is resisting the introduction of IPPs citing technical concerns**
- **Eskom's ownership of the transmission grid is a key challenge**
- **Liberalisation is no panacea**
- **One needs to look *"beyond the usual and simplistic alternative between 'free markets' and 'utility regulation', or 'decentralised decisions' versus 'central planning'… [as] it is increasingly clear that decarbonising the electricity system necessarily involves a combination of instruments"* (IEA 2016:18)**

Further reading

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- Baker, L. (2016) ‘Post-apartheid electricity policy and the emergence of South Africa’s renewable energy sector’. 2016/15. Helsinki: UNU-WIDER
- Baker, L., Burton, J., Godinho, C., & Trollip, H., (2015) ‘The political economy of decarbonisation: exploring the dynamics of South Africa’s electricity sector’, Working Paper, Energy Research Centre, Cape Town.
- Baker, L. & Wlokas, H. L. (2015) ‘South Africa’s renewable energy procurement: a new frontier?’ Working Paper Energy Research Centre, Cape Town.
- Eberhard, A. and T. Kåberger (2016). "Renewable energy auctions in South Africa outshine feed-in tariffs." *Energy Science & Engineering* 4(3): 190-193.
- Eberhard, A., Kolker, J. & Leigland, J. (2014). South Africa’s Renewable Energy Procurement Programme: Success Factors and Lessons. PPIAF, Washington DC. Available: http://www.gsb.uct.ac.za/files/PPIAFReport.pdf