

Rising Powers and Renewable Energy in South Africa

In the last three years, carbon-intensive, coal-dependent South Africa has become one of the leading destinations for renewable energy investment. Investment went from a few hundred million dollars in 2011 to \$5.7 billion in 2012 and \$4.8 billion in 2013, of which \$1.9 billion for wind and \$3 billion for solar (UNEP/BNEF 2014:27). This investment is largely due to the take off of the country's Renewable Energy Independent Power Producers' Programme (RE IPPPP), launched in August 2011. Since then a privately-generated, utility-scale renewable energy sector is being integrated into an electricity network that has historically depended on abundant sources of low cost coal. Reflecting their growing significance in international renewable energy markets, companies from China and India are playing a growing role within this sector.

Renewable energy procurement in context

South Africa's utility-scale renewable energy sector was initiated largely by national entrepreneurs in turn supported by European renewable energy companies, bi-lateral finance, foreign investment and national banks (Baker and Wlokas 2014). The sector has since witnessed greater involvement by companies from the emerging markets of India and China. In gaining market share, such companies are both collaborating and competing with the industry's early entrants particularly in wind and solar photovoltaics (PV). In all cases players in South Africa's renewable energy are embedded within a political economy and electricity infrastructure that is unique to the country.

RE IPPPP emerged in the wake of an electricity generation crisis that resulted in power outages in 2006 and 2008, a tripling in electricity prices in real terms since 2005 (IEA 2014:147) and South Africa's need to meet national commitments to climate change mitigation pledged in 2009. Grid connected renewable energy is being introduced as the country faces its worst electricity supply crisis in 40 years. As the country experiences regular load-shedding, the national utility Eskom is cash strapped and crisis ridden and now has a negative credit rating despite a R20 billion bailout from National Treasury in 2014. Meanwhile there are severe delays to the construction of the 4800 MW Medupi coal-fired power plant, year on tariff increases since 2010 and another rise of 12% in 2015 and an increasing over-reliance on expensive diesel peaking plants.

Our Research: The Rising Powers, Clean Development & the Low Carbon Transition in Sub-Saharan Africa funded by the Economic and Social Research Council (ESRC): ES/J01270X/1. Fieldwork for the project was undertaken in Mozambique, South Africa, China, India and Brazil between 2012 and 2014 and involved a combination of semi-structured interviews and community-based research methods. Our research also involved the creation of a database of clean energy projects and investments in South Africa and Mozambique.

The negotiation of RE IPPPP was part of a protracted and contested process since 2007 involving different government departments, the regulator, the utility, banks and investors, developers and civil society. This took place in a context of intense impatience from renewable energy IPPs waiting to construct and connect their projects to the country's electric grid (Baker et al 2014). RE IPPPP is a tender system based on competitive bidding which means that potential project developers bid for a renewable energy contract below a certain cap. There are five bidding rounds of which three have reached financial close and an announcement for the winners of the fourth round still pending at the time of writing. A fifth round is anticipated for which the date is as yet unclear. In South Africa's case scoring of bids is allocated 70 per cent on price below a certain cap which decreases with each round and 30 per cent on socio-economic development criteria. Such criteria include job creation, participation of historically disadvantaged individuals, local content, rural development, community ownership and skills development. The bid that meets the requirements at the lowest price wins the contract. Successful projects sell electricity to Eskom's grid under a 20 year local currency denominated, government-backed power purchase agreement (PPA).

The majority of capacity allocated under RE IPPPP is for wind, solar PV and solar CSP (see Figure 1) with 'Rising Power' involvement most evident in wind and solar PV. Sixty six projects constituting approximately 4 GW of renewables have now been approved. Approximately 924 MW have been connected to the grid at the time of writing with investment commitments of approximately \$14 billion (Eberhard et al 2014). Each bid submission of RE IPPPP has witnessed dramatic decreases in tariffs, which is in part reflective of global overcapacity in technology hardware particularly solar PV and wind. For instance the average price of solar PV bid under Round 1 was R2.76 which by Round 3 had fallen to R0.88. This parallels global developments which saw the global levelised cost of solar PV decrease by an average of one third between 2011 and 2012 (UNEP/BNEF 2013:11). This has led

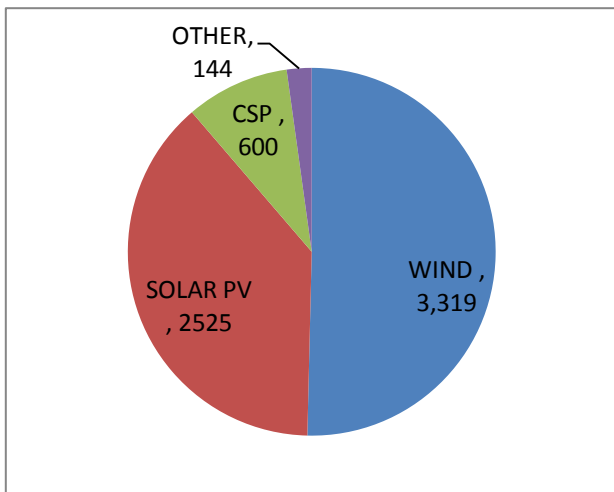


Figure 1: RE IPPPP Rounds 1-3 technology allocation by MW

to the claim that solar PV is now cost competitive with electricity produced from new build coal. Wind meanwhile experienced a 15 per cent decrease in cost between 2010 and 2014. China has made a considerable contribution to this as the world's leader in solar PV manufacturing.

RE IPPPP was launched in the same year as the country's Integrated Resource Plan for electricity (IRP 2010), an electricity master plan covering total generation requirements from 2010 to 2030. Under revision since late 2013, while coal is still set to dominate the generation mix, IRP also includes just over 20 per cent of installed capacity (17.8GW) from RE IPPPP and other private and state-managed projects.

Rising powers in renewable energy

Chinese and Indian companies are involved in some of South Africa's largest wind farms. China Longyuan Power is operating in joint venture with black-owned South African company Mulilo Energy as a developer in two projects under Round 3, the largest of which is the 139 MW de Aar wind farm. This joint venture is now in second place behind a consortium led by Irish Mainstream Renewable Power in terms of awarded MW for wind in the first three rounds of the programme (see Figure 2). The energy developer Cennergi is a joint venture between a subsidiary of India's Tata Power with one of the country's largest coal mining giants Exxaro and is building two wind farms under Round 2, of which the largest is the 134 MW Amakhala Emoyeni wind farm. This represents one of the largest financings in renewable energy in South Africa at a cost of \$412 million (UNEP/B BNEF 2014:27).

In terms of technology supply as elsewhere, European companies appear to dominate in terms of technology supply for wind and solar CSP in South Africa while China, as the world's leading manufacturer of solar PV, leads in the supply of solar PV components to RE IPPPP projects. This hardware is either provided directly by state-backed or state-owned Chinese companies (Ahlfeldt 2013:11) or companies headquartered elsewhere but who source from China where the hardware is made under licence. Such companies include Suntech, Yingli Solar, Trina Solar, Jinko solar, Build Your Own Dreams and Renesola. Meanwhile the supply of inverters appears to be dominated by European companies, with German SMA Solar and Schletter as two main players.

European companies, such as German Nordex and Danish Vestas have dominated in the supply of technology for wind, as well as engineering, procurement and construction (EPC). However there is growing emerging market involvement. Indian company Suzlon is providing the technology and undertaking the EPC for the 139 MW Cookhouse wind farm which is being developed by South African company Africa Clean Energy Developments in Round 1. Chinese Guodian is supplying to both the projects being developed by China Longyuan Power in Round 3; and Chinese company Sinovel is supplying turbines to the 26 MW van Stadens wind farm and operating as EPC in a joint venture with Spain's Iberdrola and South Africa's Group 5 for the 26 MW Klipheuwel wind farm. It seems that to date the norms of project finance still favour contractors and technology suppliers with extensive experience that to date tend to be European, when interviewed in late 2013, an IFC employee qualified: "Using an emerging market company may make the cost of capital higher, but it is hard to prove this (or find conclusive evidence)... European and American companies are more established in South Africa and it may be harder for Chinese companies to operate for this reason. Some barriers may even be cultural."

However attributing 'Rising power' or indeed any national involvement can be problematic given the complex, transient and at times opaque nature of global trade and production networks, and transnational and multi-national flows of investment and finance (Grimes and Sun 2014) which makes it difficult to attribute project ownership. As a wind energy project developer explained, "you are not going to be able to say, 'this project is from country x or company y'. The South African developers who are purely South African either don't have projects that are successful, or they are partnered in some form with someone who brings in international experience... money, technology..." Similarly a project company may be headquartered in one country, have offices and operating assets in various others, and be listed somewhere else.

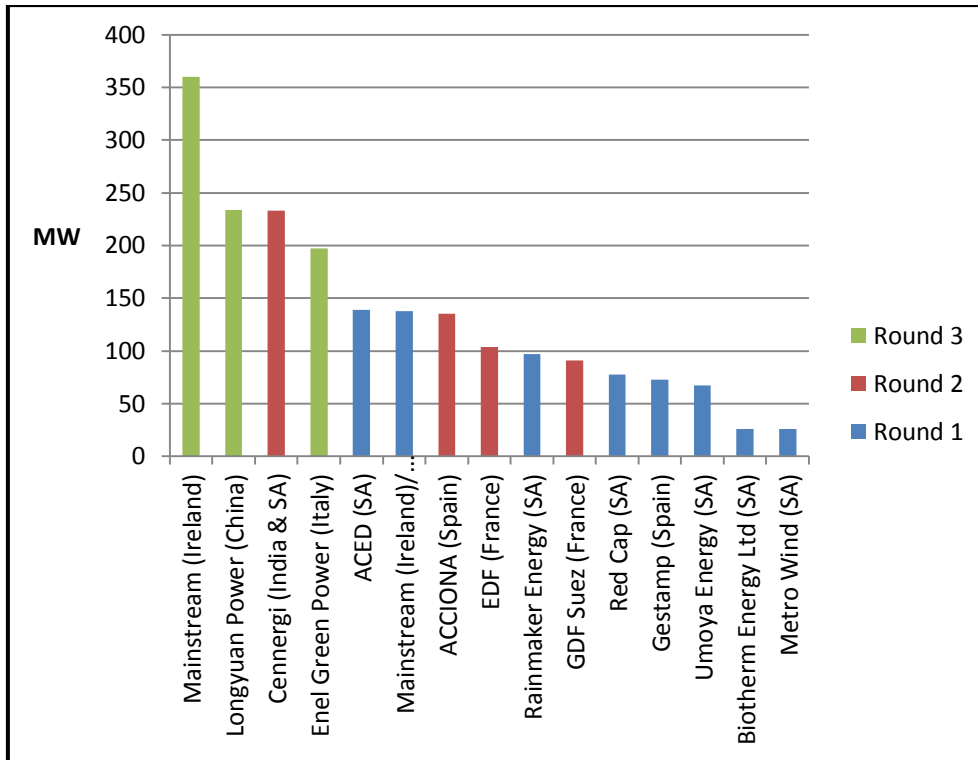


Figure 2: Approved capacity for wind by lead developer in rounds 1 to 3 (Source: Baker and Wlokas 2014)

Key Findings

Rather than being the leaders of renewable energy development in South Africa, ‘rising powers’ in this case Chinese and Indian companies, are embedded within more complex configurations of national and international South Africa. While project development in solar PV is very much the domain of European and US companies, Chinese companies are the leaders in the supply of technology to these projects. In the case of the wind industry Chinese and Indian companies are competing and at times operating together with European companies in project development and equity investment, as well as technology suppliers and engineering, construction procurement. How these patterns develop in future rounds of RE IPPPP and beyond will depend on the shape and dynamics of international markets and how they play out within the very unique context of renewable energy procurement in South Africa.

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The project team: Marcus Power (PI), Harriet Bulkeley (Co-I), Joshua Kirshner (RA) (*University of Durham*); Peter Newell (Co-I), Adrian Smith (Co-I), Lucy Baker (RA) (*University of Sussex*); Gisela Prasad (Co-I) (*Energy Research Centre, University of Cape Town*); Wei Shen (Co-I) (*Three Gorges University*). This research project also involved collaboration with two international consultant partners: The Brazilian Centre for Strategic Studies and Management in Science, Technology and Innovation (CGEE) and the international development NGO Practical Action.

Please visit our project website: <http://www.dogweb.dur.ac.uk/the-rising-powers/>

For further information about the project please contact Professor Marcus Power:
Email: marcus.power@dur.ac.uk Telephone: +44 (0)191 334 1828

