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Annex 2 - Wind Power in South Africa

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CONTEXT

South Africa has considerable potential for renewable energy, especially wind and solar. However, progress in developing these resources has been slow to take off. Roughly 93 percent of South Africa's electricity generation came from coal resources in 2011 (Burnard and Bhattacharya 2011), and less than one percent from renewable resources other than hydropower (Faure 2009). Eskom, the state-owned utility, produces 95 percent of South African electricity and also owns and operates the national transmission system. Only about two percent of the country's electricity supply is produced by private companies (Pegels 2010). The abundance of coal resources—combined with excess electricity generating capacity in the 1980s—made for historically low prices of electricity. Despite growing electricity demand and increasing costs, government subsidies have resulted in lower than market electricity prices - a constraint to the adoption of competitive but more expensive low-carbon energy technologies relative to conventional fossil fuel technologies (Faure 2009).¹

A number of other barriers have also constrained the development of wind energy, including: (i) the lack of a transparent and conducive policy framework and appropriate pricing for sale of renewable power into the main grid, (ii) insufficient information on wind energy resources, (iii) inadequate capacity in government departments to develop and implement renewable energy policy and deal with independent power producers, and (iv) lack of technical expertise in industry for development of wind projects (UNDP 2007; World Bank 2007). Furthermore, despite a strong and well-regulated financial sector, banks and other financial institutions had little experience with financing renewable energy projects, which has also limited their uptake (World Bank 2007).

EFFORTS TO CREATE AN ENABLING ENVIRONMENT

Efforts to scale up renewable energy in South Africa began in the late 1990s when Eskom initiated a program to assess and demonstrate the viability of renewable energy technologies for large-scale power generation (Eskom 2011). It resulted in the first wind farm in South Africa in 2002—a 3.2 MW demonstration project (Eskom 2004). Around the same time, the government of South Africa drafted a white paper on renewable energy, which was approved in 2003 and set a target of generating 10,000 GWh of renewable energy by 2013, roughly four percent of the estimated peak power demand (World Bank 2007). However, implementation of the policy was slow; by 2009 very little progress had been made toward meeting the 10,000 GWh target (Faure 2009).

In 2007, South Africa experienced an energy supply crisis with insufficient capacity to meet the rising demand from industry and consumers. This prompted efforts by the government and industry actors to increase energy capacity, including a renewed interest in renewable energy as a means of diversifying energy supply. An independent power producer (IPP) developed the first private sector wind project, Darling wind farm, with grant support from the Danish government and financing from the Development Bank of Southern Africa (DBSA). It came into operation in 2008 after seven years in development. The IPP signed a "green" power purchase agreement in 2007 with the City of Cape Town to sell power directly

BOX 1 | HIGHLIGHTS

- In 2003 the government of South Africa approved a white paper on renewable energy. The paper set a target of generating 10,000 GWh of renewable energy, roughly four percent of the estimated peak power demand, by 2013. However, implementation of the policy was slow.
- A number of international partners—including the World Bank, UNDP, and the Danish development cooperation agency DANIDA—supported efforts to strengthen government and industry capacity for wind energy, including wind resource assessments and strengthening the policy and regulatory environment for renewable energy.
- A number of institutional and policy changes in 2009 helped to promote renewable energy. However, a lack of clarity on the roles of various agencies, and several policy changes that did not appear to be well aligned, undermined investor confidence.
- In 2010, the Department of Energy initiated an integrated resource planning process with extensive stakeholder engagement. The process resulted in a plan that set a renewable energy production target of 19 GW of renewable energy generation capacity by 2030, made up largely of wind and solar power.
- A procurement process launched under the integrated resource plan with a target of 3725MW has seen strong private sector interest in renewable energy projects, with 64 wind, solar and biogas projects awarded thus far in three rounds of bidding.
- In 2011 the government launched the South African Renewables Initiative to support the rapid and ambitious scaling up of renewable energy in a manner that is aligned with broader economic, social, and environmental goals.

to interested users at a premium (Faure 2009; UNDP 2007). The project has encountered numerous problems and is only intermittently operational (Faure 2009), in part due to high generating costs and a pricing model that requires consumers to pay a higher price for wind power.²

In 2009, the government split the Department of Minerals and Energy into two agencies, creating a Department of Energy (DoE). The same year, the National Energy Regulator of South Africa (NERSA) approved guidelines for a renewable energy feed-in tariff (REFIT), guaranteeing higher prices for electricity generated from renewable energy, and obliging Eskom to purchase energy at the price set (NERSA 2009). The private sector welcomed this development, but shortly thereafter the DoE published regulations that established a bidding process for procurement of new generation capacity, which did not appear to be aligned with the feed-in-tariff approach (Trollip and Marquard 2010). The uncertainty created by this apparent inconsistency in policy made potential developers and investors skeptical of the South African government's commitment to promoting renewable energy.

Also in 2009, the government issued regulations under the Electricity Regulation Act of 2006 that limited the role of Eskom and NERSA in electricity planning and proposed a new integrated resource planning (IRP) process to guide decisions on new electricity generation infrastructure (Pienaar and Nakhooa 2010). The DoE released the first IRP in December 2009. The plan focused mainly on new coal generation and was found to be inconsistent with the government's emerging plans to mitigate its emissions and integrate climate change into policy making.³ The DoE initiated a consultative process to revise the IRP. In response to sustained requests from civil society and the private sector, the government made efforts to engage stakeholders in a formal public process for developing the second IRP (Pienaar and Nakhooa 2010; Idasa 2010). The government released the revised "Policy Adjusted IRP" in late 2010, which included a renewable energy production target of 19 GW, or nine percent of total electricity generated by 2030, made up largely of wind and solar power (Government of South Africa 2011a). While this was an improvement on the earlier version, several proponents of renewable energy still viewed the 19GW target as conservative (Pienaar and Nakhooa 2010).

Under the Policy Adjusted IRP, the government launched a Renewable Energy IPP Procurement Program to tender out 3,725 MW renewable energy projects, including 1,850 MW of wind. The first round of bids closed in November 2011, and 28 projects were awarded at an estimated total value of \$10–\$12 billion (CleanTechnica 2012). A second round of bids was completed in May 2012 and a further 19 projects awarded out of 79 bids received (Flak 2012). The largest commercial bank in Africa, Standard Bank Group, agreed to underwrite 27 billion Rand (\$3.5 billion) for projects in the first and second round of bidding (Cooke 2012). Despite the initial policy uncertainty, the clear role of renewables in the IRP, combined with effective management of the tendering process by the DoE (advised by the National Treasury), and a price ceiling that makes wind energy commercially viable has created optimism in the private and financial sectors. A third round of bids was completed in November 2013 with a further 17 projects awarded out of 93 bids received at an estimated value of 33.8 billion Rand (\$3.3 billion).



Further emphasizing the role of renewable energy in the country's development agenda, the government launched the South African Renewables Initiative (SARi) at the end of 2011 to support the rapid and ambitious scaling up of renewable energy in a manner that is aligned with broader economic, social, and environmental goals (Government of South Africa 2011b). The SARi estimates that \$35.6 billion in investment will be needed by 2030 to achieve the IRP's renewable energy capacity goal, using a mix of equity, low-cost loans, and financial risk mitigation products (Murray 2012; Government of South Africa 2011b).

THE ROLE OF INTERNATIONAL SUPPORT

International partners have supported various government efforts to promote wind energy development with mixed success. In the early 2000s the World Bank provided technical support to the South African government during the drafting of the white paper on renewable energy. In 2007, the World Bank supported a renewable energy market transformation project, implemented by DBSA with \$6 million from the GEF. The project supported the Department of Mines and Energy and NERSA to develop a legal, policy, and regulatory framework and a financing mechanism. It also supported strengthening the capacity of government agencies (as well as industry and financial institutions) for renewable energy, including through a matching grants program to facilitate private sector renewable energy investments (World Bank 2007).

Around the same time, UNDP supported the DoE with \$2.3 million in GEF funding to develop an atlas of wind resources and an implementation strategy and financial instruments for wind energy (UNDP 2007). This project was originally designed with a much wider scope, including a green power guarantee to the Darling wind farm project. However, this did not go ahead, as the IPP signed a power purchase agreement with the City of Cape Town and the green power model was not found to be aligned with national policy direction (LTE Energy 2011). The project was, however, successful in developing a wind resource atlas in collaboration with various national and international research and academic institutions and with \$50,000 (LTE Energy 2011) in co-financing from the Danish government (Faure 2009). It was also instrumental in strengthening the capacity of and coordination between various government departments, the private sector, and research institutions and other stakeholders in the wind sector (LTE Energy 2011). The government also received support from a number of other bilateral partners. For example, GIZ⁴ supported the Western Cape provincial government to conduct a study of the capacity of the grid to accommodate wind energy and to provide training on technical, economic, and regulatory aspects of wind energy. DANIDA supported the DoE in building a national business case for renewable energy (Faure 2009). DANIDA also supported the development of the Darling wind farm with a grant for readiness activities, including wind resource assessments (UNDP 2007).

More recently, the launching of the SARI has provided a platform by which to align international support with national policy. A number of international partners—including the governments of Denmark, Germany, Norway, and the U.K., as well as the European Investment Bank—have pledged to provide technical assistance, grants, results-based payments, and low-cost loans of up to \$9 billion, as well as insurance and other risk mitigation instruments, to support the implementation of the SARI (Government of South Africa 2011b).

OBSERVATIONS AND INSIGHTS

Efforts by the government and its international partners to promote wind energy were slow to yield results, but since 2010 there has been renewed interest by the private sector, and investment looks set to increase rapidly in the future. Lessons learned include:

- Seemingly misaligned policies and lack of clarity on the role of different government departments and the state-owned power utility (Eskom) in developing energy policy created uncertainty about the future of renewable energy, diminishing private sector confidence in the investment climate for wind energy. This highlights the need for government policies to be clear and consistent, and for energy planning to be aligned with broader climate and development goals, in order to build investor confidence.
- Civil society, academic, and research institutions and the private sector were active advocates of wind and other renewable energy technologies and were instrumental in promoting a more integrated approach to energy planning. The IRP process benefited from broad stakeholder engagement, resulting in a strengthened IRP that educed greater investor confidence.
- Creating the appropriate institutions with the requisite powers to determine and implement policy is an important step in promoting renewable energy. By splitting the Department of Mines and Energy to create the DoE and giving it responsibility for the IRP process, the government reduced the potential for conflicts of interest between the mining and energy sectors and between Eskom and private developers.
- International support needs to be aligned with national priorities to be effective. In the case of the Darling wind farm, UNDP involvement in developing a financial mechanism did not lead to its replication elsewhere in South Africa, as it was not aligned with the government's broader policy direction.
- International donors should be flexible enough to respond to the evolving needs of the recipient. UNDP's ability to re-allocate funds to different project components enabled it to focus on the wind resource atlas, which was completed successfully.



Table 1 | Milestones in the Development of South Africa’s Wind Power Sector

YEAR	MILESTONE	YEAR	MILESTONE
1998	Eskom launched the South African Bulk Renewable Energy Program to evaluate whether utility-scale renewable electricity generation—in particular wind, concentrated solar, biomass, and wave energy—would be a viable option for South Africa.	2009	South Africa’s Clean Technology Fund (CTF) Investment Plan (IP) was approved. It includes plans to provide \$500 million in CTF co-financing to support wind and concentrated solar power, solar water heaters, and energy efficiency projects.
2002	Eskom established the 3.2 MW Klipheuwel Wind Energy Demonstration Facility at a cost of about R42 million (\$3.8 million).	2009	South Africa’s president pledged at the Copenhagen climate change conference that South Africa would carry out nationally appropriate mitigation actions to enable a 34 percent deviation below the “business as usual” emissions growth trajectory by 2020 and a 42 percent deviation by 2025.
2003	The South African government approved the White Paper on Renewable Energy, which set a target of generating 10,000 GWh of renewable energy, roughly 4 percent of the estimated peak power demand, by 2013.	2010	Two projects were approved under the CTF IP to be implemented by the African Development Bank and World Bank, one supporting Eskom with a 100 MW wind farm with \$100 million from the CTF, and the other supporting private sector wind and other renewable projects with \$85 million from the CTF.
2004	The South African government established an independent energy regulator, the National Energy Regulator of South Africa (NERSA).	2011	A National Climate Change Response White Paper was released by the Department of Environmental Affairs, which commits to mainstream climate change considerations into economic, social, and environmental policy.
2005	The government established the Renewable Energy Finance and Subsidy Office within the Department of Minerals and Energy to provide capital subsidies for renewable energy projects and advice to developers.	2011	Cabinet approved the updated Integrated Resource Plan (IRP), which includes a renewable energy production target of 19 GW, or nine percent of total electricity generated (42 percent of all new and additional generation) by 2030. The IRP was formulated in consultation with a wide range of government and nongovernmental stakeholders.
2007	UNDP implemented the South Africa Wind Energy Program with \$2 million in GEF funding. Activities included wind resource assessments, strengthening capacity of government, and promoting institutional coordination.	2011	Under the IRP, the government launched a renewable energy IPP procurement program to tender out 3,725MW renewable energy projects, including 1,850 MW of wind. The first round of bids closed in November 2011, and 28 projects totaling 1415MW were awarded at an estimated total value of \$10–\$12 billion.
2007	The World Bank implemented a Renewable Energy Market Transformation project with \$6 million in GEF funding. Activities included developing a legal, policy, and regulatory framework and financing mechanism; and strengthening the capacity of government agencies, industry, and financial institutions for renewable energy.	2011	The government launched the South African Renewables Initiative (SARi) to support the rapid and ambitious scaling up of renewable energy. Support for the initiative was pledged by the governments of Denmark, Germany, Norway, and the U.K., as well as the European Investment Bank.
2008	The first commercial wind project, Darling Wind farm, came into operation with a grant from the Danish government of DKK 15.1 million (~\$3 million) and financing from the Development Bank of Southern Africa (DBSA). The project developer signed a “green” power purchase agreement with the City of Cape Town to sell power directly to interested users at a premium.	2012	The wind atlas developed under the SAWEP program was launched and made freely available online.
2008	GIZ supported the Western Cape provincial government to compile a grid study, and conduct training on technical, economic, and regulatory aspects of the use of wind energy.	2012	A second round of bids under the IPP procurement program was completed in May 2012 with a further 19 projects awarded totaling 1044MW.
2009	The Department of Minerals and Energy was split into two, creating a separate Department of Energy (DoE).	2013	A third round of bids under the IPP procurement program was completed in November 2013 with a further 17 projects awarded for 1456MW of renewable energy, at an estimated value of \$3.3 billion.
2009	NERSA approved the Renewable Energy Feed-In Tariff guidelines, guaranteeing higher prices for electricity generated from renewable energy and obliging Eskom to purchase energy at the set price. These were subsequently superseded by renewable energy bid process guidelines issued by the DoE in the same year.		

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ENDNOTES

1. Personal interviews with in-country expert.
2. Personal interview with in-country expert.
3. South Africa's National Climate Change Response White Paper was subsequently released in 2011.
4. GIZ: <http://www.giz.de/Themen/en/SID-10EE8978-84E775C1/24751.htm>

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Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

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pg. 3 Warren Rohner; pg. 4 James Anderson.

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