

NAMIBIA: OPTIMIZING DOMESTIC RESOURCE POTENTIAL



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The Republic of Namibia is in Southern Africa and borders the Atlantic Ocean, South Africa, Angola, Zambia and Botswana. Its population density is low, with an estimated population of just over 2 million in a geographic area of 318,180 square miles. At present, energy production is estimated at 2.69 TWh, with net imports of 10.01 TWh and electricity consumption of 3.22 TWh.¹ About 60% of the population resides in the north of Namibia where electrification rates are very low; and a strong majority of the country's rural population (roughly 80%) relies on wood fuel. The existing grid network currently supplies only about 30-40% of the rural population and about 98% of the urban population, with 2% lacking access as a result of mushrooming informal peri-urban settlements stemming from rural-to-urban migration. Because of the vastness of the country and low population density, it is extremely difficult to extend the grid to un-electrified areas. Recently, the country has looked to renewable energy initiatives as ways to improve electrification for its population, while addressing increasing concerns about security of supply and sustainability. This profile examines efforts by Namibia to promote domestic renewable energy, in particular via its 2005 Renewable Energy Programme and subsequent implementation, demonstrating how a country can change its energy landscape by establishing a clear foundation for RE in its national policies.

Energy Sector Background

The key players in the electricity distribution and supply business are NamPower (the state-owned power utility responsible for generation and transmission of electricity), the Regional Electricity Distributors (state-owned legal entities tasked with the supply and distribution of electricity in a dedicated region) and local authorities. The electricity supply mix is made up of a combination of domestic hydropower and thermal energy combined with imports from the Southern Africa Power Pool member countries, Zambia, Zimbabwe, Mozambique and South Africa. For the period 2000–2009, the contribution of energy imports to the national energy requirements averaged 49.8% annually, varying from 36% in 2000 to 60% in 2009. For the same period, domestic generation averaged 50.2% and varied from 64% in 2000 to 40% in 2009.

Over time, static growth in domestic generation has caused the volume of imports to increase to meet demand. This has made Namibia increasingly dependent on power supplies from beyond its borders and control.² Energy delivered into the system in 2009 dropped to 3,692 GWh compared to 3,719 GWh in 2008 partly due to demand-side-management measures and impacts of the economic downturn in the mining sector, particularly the drastic drop in demand and commodity prices of diamonds. In the short term, Namibia is focusing on demand side management programs and construction of the new Caprivi Link, creating a new electricity wheeling corridor to mitigate against transmission capacity constraints or the Namibia-Republic of South Africa interconnector. For the longer term, it is looking to build its domestic portfolio with RE.

Moving toward an RE Framework

As early as 1998, Namibia recognized the value of renewable energy as part of its energy portfolio. The White Paper on Energy Policy (1998) sets out specific national energy policy goals for the electricity supply industry as promoting or enhancing:

- Effective governance
- Security of supply
- Social benefits, including upward mobility for poorer populations
- Investment and growth
- Economic competitiveness and efficiency
- Sustainability

Although the promotion of renewable energy technologies is not mentioned as a special target of energy policies, the White Paper identifies renewable energy technologies as contributing to meeting several targets like energy security and sustainability. The White Paper identifies the “Programme on the Promotion of the Use of Renewable Energy Sources” as responsible for directing Namibia’s available resources for maximum social and economic benefit, taking into account long-term environmental concerns while giving priority attention to the country’s development needs.”³

Building upon these objectives, in 2005, the Government of the Republic of Namibia initiated a Renewable Energy Programme with support from the Global Environment Facility (GEF). The Namibia Renewable Energy Programme was designed to increase affordability and access to RE services and accelerate market development for renewable energy technologies by reducing existing barriers, including human capacity, financial, technical, awareness and other market limitations. Namibia has abundant RE resources, in particular with respect to wind, solar and biomass, but pricing remains a challenge. At present, tariffs are not cost reflective, though measures are being taken to make electricity tariffs for NamPower cost reflective by the 2012–2013 financial year. Time-of-use tariffs were also introduced in 2009 to complement other demand response measures. Still, higher costs of RE raise challenges for bringing this technology to market given existing struggles to reach cost reflective tariff levels. At the same time, this cost pressure is counterbalanced by Namibia’s desire to optimize existing RE resources and ensure security of supply. Building on domestic resource potential and security of supply objectives, the Programme’s main focus at the beginning was on solar photovoltaic technology for lighting and water pumping, solar thermal for water heating and to a limited extent, efficient domestic use of biomass. Since then, as discussed below, renewable energy projects in wind and solar have taken hold.

The Ministry of Mines and Energy (MME) enforces compliance with legal requirements on energy legislation and regulations and conducts research on new and renewable sources of energy. MME also issues petroleum licenses, sets petroleum prices, administers the National

Energy Fund, regulates the oil industry, oversees rural electrification and administers the Solar Electrification Revolving Fund. The Electricity Control Board (ECB) regulates the electricity sector (generation, transmission, distribution, supply, import and export), pursuant to powers given to it by the Electricity Act promulgated in 2000 and amended in 2007 (following the enactment of the Namibia Renewable Energy Programme). Since its inception in 2000, the ECB has concentrated on licensing, setting and implementing tariff methodologies, designing and enforcing quality of supply and service standards, and assisting the Government with the restructuring of the Namibian electricity supply industry, currently operating under a single buyer model. Plans are underway to transform the national power utility NamPower into a modified single buyer to make the market more competitive. Over time, the ECB has devoted increasing attention to evaluating and monitoring licensee performance.⁴ The ECB is also on the verge of being transformed from an electricity regulator into an energy regulator.

As part of the regulator's growth, it has assumed responsibilities in the RE sector, having already issued three licenses for wind power development. Still, ongoing work is required to lessen fragmentation of the regulatory framework and modernize it to encourage investment in RE, among other issues. To date, financing has stemmed essentially from either grants or consumers that generate electricity for their own localized consumption. The regulator is currently engaged as part of a stakeholder group in a consultation process to determine the RE incentive structures best suited to Namibia. Renewable energy usage for off-grid electrification still remains a regulatory challenge, and as part of its consultation process the ECB is looking at ways to develop an RE procurement support mechanism that incorporates RE in mainstream electricity supply as well as provides electricity to off-grid customers in rural areas who are not likely to be connected within the next 20 years or so in light of infrastructure limitations.

Investigating RE Options

Since the 1998 White Paper, Namibia has steadily continued to make progress in creating market, regulatory, and other frameworks to support RE. Namibia's regulator and other stakeholders are currently looking at support mechanisms that will drive forward investment in renewable energy, with the understanding that optimum utilization of renewable energy technologies requires a combination of appropriate policies and a favorable investment environment. The study underway is supported by the Renewable Energy and Energy Efficiency Partnership (a non-profit body established alongside the 2002 World Summit on Sustainable Development in Johannesburg) and run by the Renewable Energy and Energy Efficiency Institute (REEEI). REEEI is an arm of the Namibian Ministry of Mines and Energy created in collaboration with the Polytechnic Institute of Namibia 2006 to serve as a national information resource centre for renewable energy and sustainable energy use and management.⁵ The study is looking at various procurement mechanisms such as tendering, quotas, net metering and a feed-in tariff structure. The study has issued recommendations, currently under review by stakeholders, including:

- Tendering for solar and large wind based generation systems (those greater than 500 kW in installed capacity)

- Feed-in tariff for small wind, small hydro (less than 5 MW) and biomass including landfill gas, (less than 500 kW)
- Net-metering for photovoltaics
- Other support measures such as soft loans, grants and tax breaks to support the above instruments and continue the promotion of rural and off-grid electrification, through development and implementation of the off-grid master plan

The study also identifies the next steps that need to be taken in order to facilitate successful development. The way forward includes:

- Regulations that govern procurements for renewable energy technologies must be adopted in a clear, transparent manner; MME would lead this effort, with support of the stakeholders including the regulator
- The regulator must prepare itself, through capacity building and development of supporting procedures and rules, to implement the regulations upon adoption
- The renewable energy technologies must have access to the grid, with interconnection of the renewable energy technologies provided for in the transmission and distribution codes, as well as the metering codes (and monitored by the regulator)
- The distributors, local authorities and NamPower must buy renewable energy on a priority basis at a predetermined fixed tariff for a given period of time (pursuant to regulations set forth by the MME and elaborated by the regulator)

The study adopts a realistic approach, readying the Government and stakeholders that it might take some time (possibly greater than five years) for cost reflectivity and grid parity to be reached for some technologies. It encourages the Government to devise financing mechanisms for the procurement of renewable energy technologies in a sustainable manner in the long term, rather than ongoing reliance on a cost pass-through tariff. Finally, it proposes that the existing national Energy Fund be transformed to cover renewable energy technologies. This addition would require the adoption of a regulation to allow RE projects to benefit from the Fund, and would serve to cushion the off-taker and the consumer from direct tariff hikes while at the same time spurring the growth of the RE industry.

The development and implementation of support mechanisms for renewable energy technologies remain works in progress, with considerable steps taken toward a clear direction thanks to the REEEP/Polytechnic study. The regulator is now embarking on the next stage of the process, reviewing the findings of the study and making technical recommendations to policymakers considering the procurement options. The MME has ultimate responsibility as policy-maker, supported by technical recommendations from the regulator.

These developments have the potential to galvanize renewable energy projects that are now at the initial stages and looking to take off in the near term, as well as bringing new projects to market. The proposed Baines hydro power station on the Kunene River, for instance, is at the feasibility study stage. Namibia also has a hydro energy resource development master plan based on studies performed on its major rivers. Funding for the feasibility studies and construction of the proposed 400 MW \$7 billion Baines hydro power plant is an equally shared responsibility between the governments of Angola and Namibia. Also at present, in line with the Namibia National Renewable Energy Programme, efforts are currently under way to implement the pilot project on gasification of wood to be derived from 26 million hectares of invader bush.

The biggest change following the Namibia Renewable Energy Programme's enactment is in solar power, the main focus of the Programme. Solar energy generation has increased from 685 MWh in 2004 to 14,941 MWh in 2008. In addition, MME has introduced a revolving fund to support families and individuals not connected to the electricity grid that want to invest in solar home systems. Solar energy is increasingly used for off-grid electrification, with the first two villages having been totally energized by solar power (with Indian Government grant/donor assistance) at Spitzkoppe and Shianshuli in the Caprivi Region.⁶ As part of Government efforts to roll out use of solar water heaters, a 2007 Cabinet Directive marked the beginning of the enforcement of the resolution requiring all public buildings to meet their water heating needs through solar thermal technology. The solar hot water project is part of a larger demand side management project with six project options, on which the regulator contributed as part of a working committee dedicated to enhancing energy efficiency.

As solar power continues to develop, initiatives for wind power are also taking hold. Though the overall outcome of early wind energy study reports then was that the exploitation of wind energy was not commercially viable, developments that took place between 2005 and 2010 indicate that the likelihood of having 40-45 MW wind resource capacity integrated into the grid is considerably high. The Polytechnic of Namibia and NamPower are currently working to promote integration of wind resources and the regulator has issued three licenses already for wind development.

With these efforts in place and the study consultation well underway, the momentum to develop Namibia's renewable energy technologies is being advanced in order to meet the country's energy needs and sustainability objectives.

¹ See the International Energy Agency website, <http://www.iea.org>.

² Namibian Electricity Control Board, http://www.ecb.org.na/download.php?fl_id=150

³http://www.mme.gov.na/pdf/energy_policy_whitepaper.pdf

⁴ Namibian Electricity Control Board, http://www.ecb.org.na/download.php?fl_id=150

⁵ Namibian Renewable Energy and Energy Efficiency Institute, <http://www.reeei.org.na/aboutus.html>

⁶ The Renewable Energy and Efficiency Partnership, REEEP,
<http://www.reeep.org/index.php?id=9353&text=policy&special=viewitem&cid=95>