Status of the Just Energy Transition

in seven southern African states

NATURAL JUSTICE

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ABOUT THIS REPORT

This report assesses the status of energy systems and the policy mechanisms in place to support a Just Energy Transition in the following Southern African Development Community (SADC) countries: Angola, Botswana, Madagascar, Mozambique, Namibia, South Africa and Zimbabwe.

SADC has the lowest electricity access rates in the world and, as such, does not contribute substantially to global greenhouse gas emissions. Nonetheless, transitioning to renewable energy in a just and inclusive way would provide the region with many valuable co-benefits such as access to affordable, modern energy services; lower risks of deforestation and desertification; improved air quality and health outcomes; reduced ecosystem pressure; and a reduction in the time women and girls spend finding energy sources.

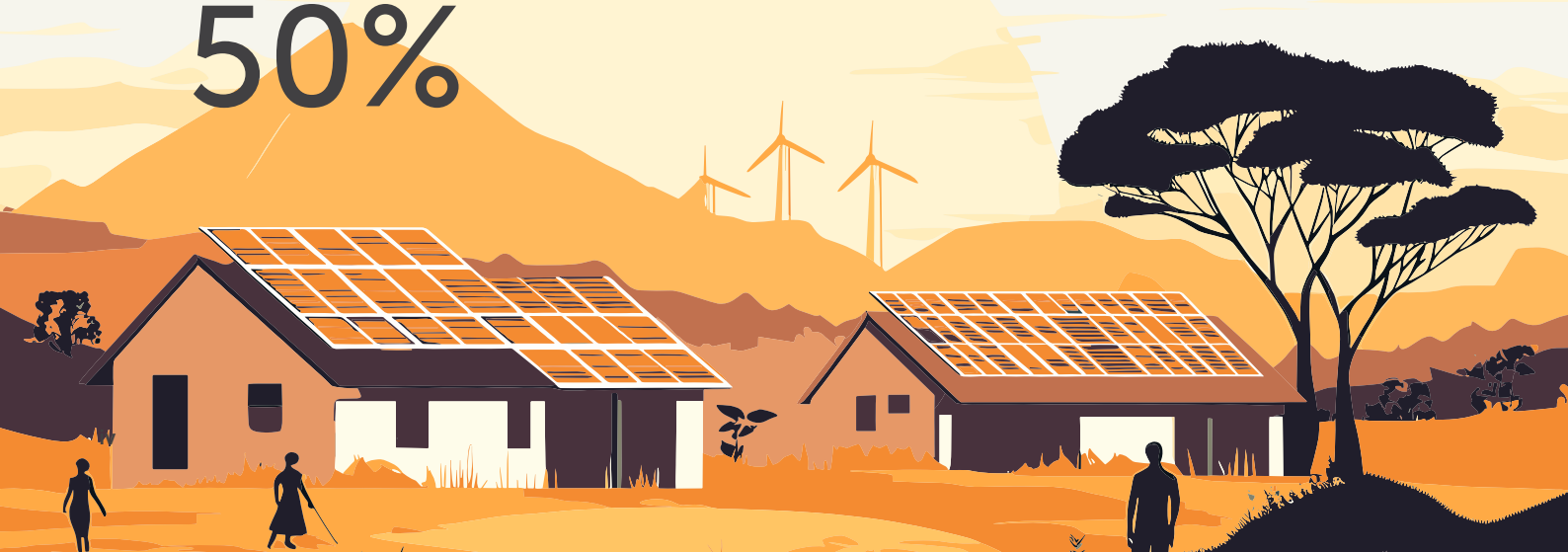
In addition to outlining the status quo of energy system arrangements and policy frameworks relevant to the energy transition, this report examines the mechanisms in place to drive the transition towards a low-carbon, climate resilient, fair and inclusive economy and society.

Contents

Introduction

Approximately half of the 16 Southern African Development Community (SADC) countries have electricity access rates lower than

50%



Southern Africa currently has the lowest electricity access rates in the world, with approximately half of the 16 Southern African Development Community (SADC) countries having access rates lower than 50% in 2024. Many people still rely on biomass such as charcoal and wood fuel to meet their energy needs. Reducing this reliance by transitioning to renewable energy, even as sub-Saharan Africa's electricity needs continue to grow, would provide many co-benefits such as access to affordable, modern energy services; lower risks of deforestation and desertification; improved air quality and health outcomes; reduced ecosystem pressure; and a reduction in the time women and girls spend finding energy sources.

Africa is one of the lowest contributors of global greenhouse gas emissions in the world, yet it is extremely vulnerable to the impacts of climate change, which include human deaths linked to severe weather events, loss of biodiversity, water shortages, reduced food production and reduced economic growth. Climate change also poses a risk to water resources, which in many countries are used to generate electricity through hydropower. This is just one of the ways in which the changing climate undermines human energy security.

Regional integration is important for achieving energy security in SADC. To this end, the Southern African Power Pool (SAPP) was created in 1995 at a SADC summit. The SAPP sees utilities from 12 member states – including South Africa's Eskom, which has a predominantly coal-fired generation fleet – contribute to a regional electricity power pool.

The energy sector remains the continent's biggest producer of greenhouse gas emissions from burning fossil fuels, followed – after a large margin – by agriculture, industrial processes and waste. The 2015 SADC Climate Change Strategy and Action Plan has identified the energy sector – comprising of petroleum and gas, coal, wood and charcoal, nuclear energy, renewable energy and energy efficiency – as an important target for mitigation measures that include the increased use of renewable energy. Renewable energy is also a key feature in the SADC Regional Indicative Strategic Development Plan, with interventions focusing on improved access to affordable, diversified renewable energy.

The SADC Climate Change Strategy has identified several actions to promote energy efficiency while driving the development of renewable energy. These include:

- **Strengthening energy planning**, research and development and regional integration
- **Promoting advocacy, communication and information sharing on renewable energy technologies**
- **Reviewing regulatory frameworks** in member states to allow for greater investment and trade in renewable energy
- **Promoting demand-side management policies** that improve energy efficiency and conservation
- **Establishing regional standards and regulations** on energy efficiency
- **Developing a renewable energy map** for SADC
- **Supporting the implementation** of the SADC Regional Energy Sector Plan.

In 2015, SADC member states established the Southern African Development Community Centre for Renewable Energy and Energy Efficiency (SACREEE) to increase access to modern energy services and improve energy security by promoting the uptake of renewable energy and energy-efficient technologies. However, according to a 2021 SACREEE status report, while some countries have managed to establish well-defined processes for the market-based uptake of renewable energy and energy-efficient technologies, others have not implemented any measures to date.

WHAT QUALIFIES AS "RENEWABLE ENERGY"?

Defining energy as "renewable", "green" or "clean" is inherently value-laden and political. Factors such as the availability of indigenous renewable energy sources, the historical origins of regulatory support for renewable energy, the outcomes of political debates on the strategic direction of the energy sector, and even external political events play a role in determining which energy sources can claim to be "renewable".

As the climate crisis worsens and the transition to low-carbon, sustainable energy sources become increasingly imperative, providers of these energy sources stand to benefit greatly from public regulatory support and public and private investment flows.

Nuclear energy is the clearest example of how it can be difficult and politically challenging to determine whether an energy source is renewable (Box 1). There are also debates surrounding geothermal energy, large-scale hydropower, and traditional biomass and their inclusion into the list of renewable energy sources.

GROWING PRESSURE FOR A JUST ENERGY TRANSITION

States are facing increasing pressure from suppliers, businesses and civil society to make infrastructure investments into renewable energy systems and develop policy and regulatory frameworks that promote renewable energy and just transitions.

Over the past decade, private investment into renewables has grown to the point where it was the largest investment sub-sector in 2020, driven largely by investments in high-income countries. Net-zero commitments and the push for environmental, social and corporate governance on the part of the investment community as a means to identify material growth prospects and risks, are driving private investment in non-fossil fuel generation, transmission and distribution energy infrastructure.

At the same time, litigation cases relating to the just transition are increasing. South Africa, for example, has seen many challenges against coal-mining projects. This shows how legal action is shaping energy transitions in the region.

GREEN FINANCE TAXONOMIES

States can have a large impact on the direction of private investments by developing and applying green finance taxonomies. These taxonomies define a minimum set of assets, projects, activities and sectors that can be defined as "green" in line with international best practices and national priorities.

In 2020, the EU established a framework to facilitate sustainable investment (the Taxonomy Regulation) which defines criteria for environmentally sustainable economic activities that contribute to one or more environmental objectives such as climate change mitigation. A key aspect of the Taxonomy Regulation is that generating, storing, transmitting, distributing or using "renewable energy" qualifies as a sustainable economic activity.

Unfortunately, the war in Ukraine and subsequent concerns over the flow of Russian gas to the EU have resulted in the EU approving the Complementary Climate Delegated Act of 2022, which lists gas and nuclear energy activities as sustainable economic activities under the EU Taxonomy. These changes in the EU's green taxonomy mean that gas and nuclear suppliers now benefit from the same financial incentives as renewable energy producers, highlighting how green taxonomies are inherently political and value-laden and can shape investments in renewable

energy. However, the EU Taxonomy Regulation does show the potential of positioning renewable energy within the broader conceptual framework of sustainable economic activities and how this can direct investments towards a low-carbon energy future.

This report outlines the current status of the Just Energy Transition in select countries in SADC in the form of country reports for Angola, Botswana, Madagascar, Mozambique, Namibia, South Africa and Zimbabwe. It outlines the status quo energy system arrangements and policy and legal frameworks that are relevant to the Just Energy Transition. It also examines the mechanisms put in place to progress towards a low-carbon, climate resilient, fair and inclusive economy and society.

Data sources

Data used in this report were primarily sourced from World Bank and International Energy Agency databases, which are available to the public. Where these sources were unable to provide regional- or country-level data, local government data was used.

Case Study

NUCLEAR ENERGY

Political contexts can influence energy definitions. A good example of this is nuclear energy. The first attempts to label nuclear energy as "renewable" coincided with the first forms of regulatory support for the accelerated deployment of renewables. For instance, the UK set up the Non-Fossil Fuel Obligation Order in 1990, mandating electricity distribution network operators in England and Wales to purchase nuclear energy, as well as other forms of renewable energy, conceptually aligning nuclear energy with renewable energy rather than fossil fuels.

While nuclear energy is undoubtedly low-carbon – the lifecycle greenhouse gas emissions from a nuclear power plant are two orders of magnitude[1] lower than fossil-fuel generators – it does not meet any of the other sustainability criteria of renewable energy. Nuclear feedstocks are non-renewable mineral resources, nuclear power produces radioactive waste that places an irreversible management burden on future generations, and nuclear facilities pose health and security risks. Constructing and operating nuclear power plants is expensive and frequently results in cost overruns and spiralling costs.

All of these factors have resulted in the almost universal resistance to label nuclear energy as "renewable". Only one country in the world – Ecuador – has included nuclear power in its legislative definition of renewable energy.

1 The equivalent of multiplying by 0.01, or 10-2.

The status of the Just Energy Transition by country

Angola

Angola intends to increase the contribution of hydropower to the energy mix from 70.4% in 2022 to 85% in 2030. But high levels of corruption, coupled with a history of challenges by communities displaced by large hydro projects, raises doubt as to whether this plan supports a just transition.

About half of Angolans are subsistence farmers, and more than 70% of the economy is informal. The most vulnerable groups are farmers, fishers and informal workers eking out a livelihood in coastal cities. These groups have already experienced climate change impacts in the form of droughts, coastal erosion and flooding. Over the past decade, southern Angola experienced a protracted drought described as the worst in 40 years, with close to 5 million people either having insufficient food or facing acute food insecurity.

It is in this context that Angola plans to reduce its dependence on traditional biomass and oil by developing its hydropower resources, with gas as a backup. While hydropower typically provides a stable, low-cost supply of electricity, Angola's growing reliance on hydropower will make the country vulnerable to power cuts during droughts, which are predicted to increase across southern Africa.

Categorising large-scale hydropower as a renewable energy is also highly controversial. Seventy-seven countries in the world include large-scale hydro in their definitions of renewable energy, while 27 exclude it because of the environmental impacts associated with building large dams. Hydropower projects also have a history of benefiting from government subsidies, raising economic concerns, and of generating societal conflict with displaced locals.

Angola's planned 600 megawatt (MW) Orokawe dam (recently expanded to 880 MW) serves as an example of how conflicts with local communities can stall hydropower plans. In 2012, the Ovahimba and other Indigenous Peoples adopted the Orokawe Declaration, in which they set out their objections to the dam. The communities have also invoked international rights (specifically the United Nations Declaration on the Rights of Indigenous Peoples) to support their cause. Although the state signed bilateral agreements for the project in 2020, no construction firm has been appointed and the project remains in limbo.

The 2 172 MW Caculo Cabaça Hydropower Project has for years been plagued by allegations of corruption due to its links with the controversial businesswoman Isobel dos Santos. Investigations by journalists found that dam construction workers were allegedly expected to work without personal protective equipment, with several workers obtaining injuries. Despite these controversies, construction continues. The station is due to be commissioned in 2028.

KEY FACTS

In 2022, Angola's electricity was supplied by hydropower (70.4%), oil (16.2%), natural gas (10.9%) and solar photovoltaic (2.5%).

Its economy relies heavily on oil, which accounts for 90% of export revenues and contributes approximately a third of GDP.

Angola has been unable to use the revenues from oil extraction to reduce poverty or drive broad-based economic growth. A third of the population still lives below the national poverty line.

Angola's electricity access was low at 48.5% in 2022. Three-quarters of people in urban areas (76.2%) have electricity.

Only 7.3% of people in rural areas have access to electricity.

Although the state subsidises the cost of electricity, there was a 77% price hike in 2019.

Angola intends to increase the contribution of hydropower to the energy mix

to 85%

OUTLOOK FOR ANGOLA'S JUST TRANSITION

Huge potential for solar, but little effort to access non-hydro sources

There is consensus that Angola has substantial renewable energy potential. The Ministry of Energy and Water has identified the potential for 16.3 gigawatts (GW) of solar power, 3.9 GW of wind power and 18 GW of hydropower throughout the country. According to the International Renewable Energy Agency, more than 70% of Angola's land area exceeds world averages for solar resource potential. Despite this potential, non-hydropower renewables make a negligible contribution to Angola's current energy mix. This will likely remain the case, with the Angola Energy 2025 strategy stating that, of the recommended 9.9 GW of installed capacity, 66% should come from hydro and 19% from gas. Only 15% of this capacity should come from "new renewables" (solar, wind and micro-hydro). This breakdown underscores the reality that the government regards large-scale hydro as a renewable source and prefers gas to solar for backup power.

Policy is top-down and geared towards low-carbon development rather than a just transition

The US Department of State says this about legislative and regulatory frameworks in Angola: "The public does not participate in draft bills or regulations formulation, nor does a public online location exist where the public can access this information for comment or hold government representatives accountable for their actions." The key voices and drivers for Angola's transition to low-carbon development are donors and the state. However, there is no explicit "just transition" process that allows for broad-ranging participation and consultation. Angola's political culture and constitutional framework does not support broad-based participatory democracy. As a result, conceptualisations of an energy shift tend to be top-down and focused on low-carbon development ("um desenvolvimento de baixo carbono") rather than a just transition.

Who owns current renewables infrastructure?

The current renewables industry is dominated by players from Brazil, China, the United States, France and Italy. Two foreign-owned oil and mining entities have partnered with Sonangol, the state-owned oil company, to develop distributed solar facilities totalling 85 MW combined; one company intends to have 385 MW of solar online by 2027. Given these conditions – and with Angola's Minister of Mineral Resources, Petroleum and Gas stating that "fuels, especially natural gas, will ultimately be responsible for the energy transition" – one can conclude that a just transition pathway is still contested in Angola.

KEY FACTS

Botswana gets most of its electricity from coal-fired plants (96%). Solar, biogas and biodiesel contribute less than 1%.

The country has abundant coal reserves (>200 billion tonnes) and ranks 69th in the world for coal consumption. Mining is the backbone of the country's economy, contributing almost 40% of total revenue. It is also a major consumer of electricity, petroleum products and water resources.

Botswana's economy is not particularly energy intensive at 2.7 megajoules (MJ) per unit of GDP, which is only slightly higher than the SDG target of 2.6 MJ.

Electricity access is relatively high at 75%. However, this is focused on urban areas, where electricity access stands at 95%.

Only 25% of the population have access to electricity.

Major energy consumers are the residential (42%), transport (27%) and industrial (23%) sectors. Botswana is not heavily industrialised.

The government has targeted 100% national electricity access by 2030.

Botswana

Coal-fired power will remain the dominant source of electricity generation in Botswana due to an abundance of coal reserves and increasing coal-mining activity. However, solar power is also expected to grow rapidly, driven by an ambitious plan for Botswana to become a net exporter of energy in Southern Africa, highlighting a tension between fossil fuel reliance and renewable energy development.

Botswana's power system is unreliable and suffers from lack of investment, poor maintenance and high service costs. The state-owned entity, Botswana Power Corporation, generates only enough electricity to meet 80% of the country's electricity needs. The rest is met by diesel plants, which are intended to support peak load but are in regular use, and energy imports from the Southern African Power Pool, which consists of energy from 12 SADC states, including South Africa's coal-fired power plants. Even though Botswana has vast, untapped solar resources, solar power contributes less than 1% to the energy mix. The recently commissioned 1.4-million-tons-per-year coal mine at Morupule will also boost coal exports in the wake of increased demand following the war in Ukraine.

Botswana's approach to renewable energy is guided by, among other policies: (i) the 2018 National Climate Change Strategy and Action Plan, which urges the country to increase its reliance on low-carbon energy and improve its energy efficiency. This strategy recommends financial and tax incentives to encourage micro, small and medium enterprises, rural community enterprises and households to become more energy efficient; (ii) the 2020 Integrated Resource Plan, which aims to achieve 15% renewable energy by 2030 and 50% by 2036; (iii) the National Energy Policy of 2021, which aims to improve access, security and reliability of energy supply to all sectors, particularly low-income and marginalised groups, by increasing the use of both renewable energy and "clean coal" technologies. This policy also supports gender mainstreaming in the energy sector. Lastly, (iv) Vision 2036, which envisions diversified, safe and clean energy sources and becoming a net energy exporter. Vision 2036 recommends creating an enabling environment for public-private partnerships and investments in clean energy technologies and renewable sources.

OUTLOOK FOR BOTSWANA'S JUST TRANSITION

Substantive steps have been taken to increase solar energy

The Government of Botswana has implemented several strategies to advance the use of renewable energy and promote private investment in renewable energies. The jewel in the crown of the country's renewable energy strategy is the Mega Solar initiative. This programme intends to develop the largest solar park in Africa, capable of generating between 3 000 and 5 000 MW – well in excess of the 1 017 MW that Botswana is expected to need by 2025. To date, four out of the 12 related agreements have been signed. This programme and other standalone solar projects are expected to help alleviate the region's power deficit. In 2020, Botswana also launched a Rooftop Solar programme with the assistance of USAID's Southern Africa Energy Program. This programme allows domestic consumers to install solar systems and sell their excess electricity to the Botswana Power Corporation.

Coal remains the dominant energy source

Despite noteworthy developments in renewable energy, the energy source for electricity is overwhelmingly coal (96%) and oil (3.8%). The country has two operating coal mines (Morupule and Masama) and the development of a third (Mmamabula) is under way. There are also plans to increase coal-to-gasification and coal-to-liquids.

The government is working to improve rural access to electricity

A 2018 World Bank study found that 126 out of 493 rural villages in Botswana might never be connected to the grid due to their remoteness. The study concluded that it might be more or equally cost effective to install isolated solar systems in these remote areas.

Two programmes are dedicated to bringing electricity to rural areas: the Rural Electrification Program and the National Electricity Standard Connection programme, which involves a uniform household electricity connection charge of BWP 5 000 (US$ 375.26) in recognised settlements. To implement these connections, the government has established a National Electrification Fund (NEF), which generates revenue through a levy of 10 thebe (US$ 0.0075) per kilowatt-hour of electricity sold by the Botswana Power Corporation. The NEF finances the difference between the actual household electricity connection cost and the National Electricity Standard Connection cost. At least 118 759 households were electrified under the latter scheme by 2019.

Environmental and socioeconomic rights are not protected under Botswana's constitution

Environmental rights are not protected by Botswana's constitution and courts have been reluctant to extend existing human rights to include the environment. For example, in the case of Matsipane Mosetlhanyane & Others v The Attorney-General of Botswana, local communities in the Central Kalahari Game Reserve challenged the government for sealing off and dismantling boreholes in the reserve, affecting the communities' access to water and violating their constitutional right to not be subjected to inhumane or degrading treatment.

KEY FACTS

Madagascar gets its electricity from imported fuel, hydropower (between 39% and 59%), coal and renewables (1.4% from biofuels and 1.3% from solar).

However, electricity access is low at 36.1%. This is skewed in favour of urban populations, about 71.6% of which have access to electricity.

Less than 11% of the rural population has electricity.

The lack of electricity is driving deforestation as communities turn to fuelwood, which provides about 85.8% of Madagascar's primary energy. Fuelwood (firewood and charcoal) is mostly used for cooking while kerosene is used for lighting.

The government has targeted 70% access to electricity, with 80% of the energy mix from renewables, by 2030.

Madagascar does not have a single national electricity grid. Three major grids service about 86% of the electrified population. A project to interconnect the three grids is under way.

Madagascar

Madagascar's ambitious target of 80% of electricity from renewable sources by 2030 masks the reality of a country plagued by energy governance challenges, in which only 71.6% of urbanites and less than 11% of the rural population have access to electricity, and independent power producers provide energy at very expensive rates.

Madagascar's electricity sector has been described as being in crisis. Only 36.1% of the population have access to electricity, almost exclusively in urban areas. Non-technical electricity losses are high, with 37% of the electricity generated not being billed, and lack of maintenance is eroding the installed generation capacity of 680 MW. In 2016, those who were fortunate enough to be connected to the grid suffered from power outages of about 1.5 hours each around six or seven times a month.

At the heart of this crisis is Jirama, the state-owned electricity and water utility, which has in recent years found itself in an unsustainable and extremely challenging financial situation. Madagascar has a very low electricity price of US$ 0.12 per kWh for residential uses, with the cost of producing that energy being almost double that. This has impacted Jirama's financial viability, which has been further challenged by contracts that oblige Jirama to "take or pay" energy from independent power producers at expensive rates, pointing to the possible misuse of public funds.

Between 1998 and 2004, Madagascar introduced policies to encourage private-sector participation in the energy sector, particularly for rural electrification. About 20 micro, small and medium-sized enterprises have since rolled out about 80 electricity projects in rural areas using a blend of renewable and fossil fuels. Today, private producers account for 47% of electricity produced in Madagascar.

OUTLOOK FOR MADAGASCAR'S JUST TRANSITION

Government is committed to a renewable energy vision built around hydropower

The government has set progressive targets for renewables of 80% by 2030 and 100% by 2050. Hydropower plays a large role in these plans. A short-term plan to launch tenders for 10 hydropower sites has been developed. Small autonomous power plants with a capacity below 1.5 MW will be selected for rural electrification.

Huge potential for solar and wind

Madagascar has great natural potential for solar energy, much of which remains untapped. On average, the island state enjoys more than 2 800 hours of sunlight per year, with potential solar capacity of 2 000 kWh/m^2/year. By 2030, 15% of households should be supplied by solar power under the government's *Nouvelle Politique de l'Energie* (NPE, New Energy Policy) for 2015 to 2030.

Wind energy also holds great potential of 2 000 MW, with strong winds averaging 6 to 8 m/s at 50 meters height in the north that blow more than half of the year, winds with an average speed of 8 to 9 m/s in the south, and steady winds of 6 to 6.5 m/s in the plateau and central regions.

Renewable energy IPPs face challenges

As the main grid does not reliably meet electricity demand, IPPs started to generate power in 2013, with about 20 operators (mainly small and medium-sized companies) installing about 80 renewable energy, hybrid renewable energy/diesel and diesel systems in rural areas.

Challenges faced by these private-sector participants include accessing financing for small-sized projects, institutional capacity (accounting and business plans) and the low income of the population.

No precedent for environmental rights-based legal cases

No specific climate change or directly related environmental rights-based cases have been noted in Madagascar. The country's laws do not appear conducive to public interest litigation. Although civil society organisations are active in advocacy efforts, access to courts does not appear to be a right stipulated in Madagascar's constitution.

KEY FACTS

In 2022, Mozambique got most of its energy from traditional biomass (4.3%), oil (16.2%), hydropower (11.6%) and natural gas (7.9%).

In the same year its electricity sources were hydropower (82.7%), natural gas (15.7%), coal and oil (0.7%), biofuels (0.6%) and solar (0.3%).

Mozambique's Cahora Bassa is the second-largest hydropower scheme in Southern Africa. However, most of the electricity it produces is sold to South Africa.

Electricity access was very low at 33.2% in 2022. About 79.4% of urban populations had access to electricity, while access in rural areas declined from 8% in 2018 to 5% in 2022.

Electricity outages lasting more than an hour are commonplace.

Non-hydro renewables are projected to increase from 1.5% of the generation mix to 3% by 2031, totalling about 200 MW.

Mozambique has three separate electricity grids. The government wants to connect and expand these systems to integrate solar and wind generation.

Mozambique

Despite having ample solar, wind and biomass potential, Mozambique has made moves to exploit its substantial gas reserves, build new coal-fired generating capacity and develop large-scale hydropower projects that will displace hundreds of households in order to achieve national electricity access and to establish itself as a regional energy exporter.

Electricity access in Mozambique is low at 33.2%, with coverage primarily focused on urban areas. At the same time, most of the electricity produced by the 2 075 MW Cahora Bassa hydropower scheme is sold to South Africa. In this context, it is unsurprising that traditional biomass remains Mozambique's main energy source.

When the Cahora Bassa dam was built between 1969 and 1979, tens of thousands of people were forced to relocate. About half a million people who depended on the river and the delta for their livelihoods were also impacted. Despite this troubled history, the government has initiated several new hydro projects to capitalise on Mozambique's 19 GW hydropower potential. These include the proposed 1 500 MW Mphanda Nkuwa hydroelectric project, which is expected to be built 60 km downstream of Cahora Bassa, and which will see 1 400 families relocated and affect the livelihoods of a further 200 000 people; and the Moamba-Maior dam, which started being built in 2016 but stalled due to contractors being investigated for money-laundering and corruption.

Mozambique has pledged to ensure universal electricity access by 2030, which will require 2 300 MW of new generation capacity and about 5 million on- and off-grid connections. It also aims to position itself as a regional energy exporter. The country's 100 trillion cubic feet of proven gas reserves looks set to play an important role towards achieving the second objective, with the government awarding four concessions for gas exploration and production to four separate conglomerates led by ExxonMobil, Sasol, ENI and Delonex Energy (UK) in recent years.

OUTLOOK FOR MOZAMBIQUE'S JUST TRANSITION

Good potential for various renewable energy sources

Non-hydro renewables are projected to increase from 1.5% of the power generation mix to 3% by 2031, totalling about 200 MW. However, Mozambique could obtain substantially more electricity from non-hydro renewable sources, according to the Renewable Energy Atlas, which found that there is potential for:

- **More than 2.7 GW of viable solar energy**, of which almost 600 MW could be grid-connecteds
- **More than 2 GW of biomass energy**, focusing mainly on residual forest biomass (1 006 MW) and sugar bagasse (831 MW)
- **4.5 GW of wind projects**, of which 1 100 MW could be connected to the grid. The remaining 3.4 GW would require further investments in the transmission and distribution system.

A policy landscape that supports renewables from IPPs

In 2010, the Government of Mozambique approved a public-private partnership framework allowing the state-owned utility *Electricidade de Mocambique E.P.* to commission various renewable energy IPP projects throughout the country, including projects in Mocuba (40 MW) and Cabo Delgabo (40 MW). In 2022, a contract was signed to develop the 100 MW Chimuara solar park and in 2023, Ncondezi Energy investigated the feasibility of installing a 300 MW "solar-plus" facility in the Ncondezi mining concession in Tete province.

Most recently, the Council of Ministers approved the Just Energy Transition Strategy (2023) (ETS) on 29 December 2023 under the functions listed in Section 203(1) of the Constitution. The ETS seeks funding of US$ 80 billion by 2050 to achieve an energy transition. The comprehensive strategy aims to propel the nation towards a more sustainable future by enhancing renewable energy capabilities and ensuring wider electricity availability. It was presented at COP28.

Renewable energy IPP sector is currently dominated by foreign interests

The main actors in Mozambique's renewable energy industry originate from Scandinavia, France, Brazil and South Africa. In 2013, the President of Mozambique opened the country's first solar production facility at the Beluluane Industrial Park in Maputo. The company was still operating in 2016 but is unclear whether the facility is still operational.

Despite efforts to facilitate a bottom-up approach, communities have been excluded from key decision-making processes relating to climate change

The government has established the Inter-Institutional Group on Climate Change, which is composed of representatives from the public and private spheres and civil society, to report on the implementation of climate change actions in represented sectors. This mechanism allows affected sectors to report on challenges and needs that may arise. However, when the long-term Integrated Master Plan 2018–2043 was developed, only government entities, electricity generation and supply companies, and selected academic institutes, foreign donors and NGOs were invited to contribute. Peoples affected by various proposed projects were not included in decision-making, even though the plan recommended a 30% increase in power tariffs (implemented in 2019) and discussed land acquisition and settlement, among other relevant issues.

KEY FACTS

Namibia's primary energy sources in 2021 were imported oil (68.6%), biofuels and waste (23%), hydropower (4.9%), renewables (2%) and coal (1.1%).

The worst drought in a century has substantially reduced installed hydro capacity.

Most of the rural population and about 20% of the urban population depends on woody biomass for cooking and heating.

In 2022, 74.8% of the urban population had access to electricity versus 33.2% of the rural population.

71% of the country's electricity was imported from neighbouring countries in 2019.

The remaining electricity was sourced locally from hydropower (332 MW), coal (120 MW), diesel (46.5 MW) and 17 renewable energy independent power producers, most of which used solar (126.5 MW).

Namibia aims to achieve 70% or more electricity from renewable sources by 2030.

Namibia has targeted universal access to at least one type of modern energy service, including a form of electrical service.

Namibia

The presence of substantial oil and gas reserves could disrupt Namibia's low-carbon development path, which benefits from vast, untapped solar resources and a policy and finance landscape that supports the gradual expansion of a decentralised electricity generation network based on renewables.

Namibia's energy sector is currently vulnerable due to the country's heavy reliance on imported electricity and liquid fuels. Namibia imports 100% of its liquid fuels, including petrol, diesel, jet fuels and liquid petroleum gas. On the electricity front, substantial annual increases in local tariffs have negatively affected affordability and could drive inflation and weaken regional competitiveness. This dependence on imports raises supply security concerns.

Renewable energy could help address these concerns. Namibia is said to have one of the best solar irradiation regimes in the world, suitable for both solar electricity and solar thermal applications. The country also has areas with significant wind potential, mostly along the coast, where commercial use is envisaged. Its long coastline also holds promise for ocean and wave energy. Despite this renewable energy potential, the presence of substantial oil and gas reserves could disrupt the country's low-carbon development path.

The country's National Renewable Energy Policy 2017 aims to achieve 70% renewable energy in the country's electricity mix by 2030. The policy further intends to enable greater participation of Namibians in the renewable energy sector and to make renewable energy a vehicle for expanded access to affordable energy. Affordable energy is regarded as being foundational for income-generating opportunities that combat poverty.

Coupled with a properly functioning national electricity utility, this and other progressive policies are driving the uptake of renewable energy and energy-efficient technologies across the country. Indeed, 17 renewable energy IPP projects totalling 126.5 MW of generating capacity were commissioned in the four years between 2015 and 2020, and there is every indication that this approach will be scaled up in coming years. Consumers are reportedly also increasingly generating their own electricity and feeding excess back to the grid at a fee. As a consequence of these and other measures, the state-owned electricity utility, NamPower, anticipates that it "will become a supplier of last resort, supplying customers who are unable to procure electricity from other providers".

OUTLOOK FOR NAMIBIA'S JUST TRANSITION

Oil and gas will continue to dominate for now, with measures to reduce national risk

Namibia does not have refining capacity and imports all liquid fuels. A strategic liquid fuels storage facility with a capacity of 73 000 m^3 is being constructed at the new port in Walvis Bay to improve supply security and reduce reliance on private oil companies. In addition, the country has an estimated 11 billion barrels of oil and 2.2 trillion cubic feet of gas. One of the National Energy Policy 2017's key aims is to attract investments to further explore Namibia's oil and gas potential. This includes commercialising its natural gas resources, improving supply security through increased product storage and enhancing access to products, especially in the remote areas of the country.

Enabling policies and institutions support renewable energy from both IPPs and consumers

The Renewable Energy and Energy Efficiency Institute was established in 2006 and converted to the Namibia Energy Institute in 2014. One of the institute's strategic goals is to "catalyse the transition to advanced sustainable energy exploration, generation, distribution and utilisation through coordinated research and development, capacity building and project management".

The 2018 Independent Power Producer Policy is one of several policies that supports the establishment of a financially viable and sustainable IPP industry to achieve security of supply and diversify the energy mix. The policy aims to design a level playing field through transparent, fair and equitable policies that guides the entry of private investors into the Namibian power market.

In addition to creating an enabling environment for renewable energy IPPs, the government has established a fund to help consumers purchase renewable energy technologies for household use.

Access is a priority

The Government of Namibia has targeted access to at least one type of electrical service for all Namibian households, especially those in rural and unserved urban areas, complemented by relevant modern thermal energy services. To achieve this, it has embraced off-grid and non-electrical means as an acceptable alternative to grid electrification and encourages the use of efficient modern energy service options.

Green hydrogen ambitions

Namibia currently has eight projects at different stages to produce green hydrogen. These projects were developed in collaboration with Germany, who provided startup capital. The green hydrogen is apparently intended for export purposes.

KEY FACTS

South Africa gets electricity from coal (70.9%), diesel (7%), nuclear (4%), pumped storage (5%), hydro (3%) and renewables (7%).

South Africa is the world's 14th largest emitter of greenhouse gases and the world's 7th largest coal producer, about 28% of which is exported.

Electricity access is relatively high for the region, at 86%. Rural areas have a higher rate at 93.4% when taking into consideration the lower level of electrification in urban areas arising from the burgeoning informal settlements around primary and secondary cities and towns.

In 2022, South Africa experienced 1 949 hours of "loadshedding" (when the national utility imposes rolling blackouts to prevent grid collapse). This has been suspended since March 2024, though the possibility remains.

In Africa, South Africa is among the top three countries for solar power.

The government's Renewable Energy Independent Power Producer Procurement Programme (REI4P) had added 3.8 GW of renewable energy to the grid by 2019. Most of this capacity is owned by foreign interests.

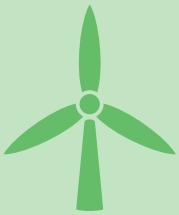
South Africa

Despite resistance from politically and financially powerful parties with vested interests in fossil fuels, South Africa's just transition is slowly gathering momentum with the passing of the Climate Change Act in July 2024, which formally mandates the Presidential Climate Commission to manage the country's just transition.

South Africa's just transition has been characterised by false starts, legal battles and ambitious policies that struggle to find real-world application.

On the one hand, the country has an energy system that is amongst the most coal-dependent in the world, with fossil fuels (coal and diesel) making up approximately 78% of installed capacity. South Africa's heavy reliance on coal-fired power makes it the world's 14th largest emitter of greenhouse gases and creates substantive environmental, health and societal impacts in the Mpumalanga province, where most of the country's coal reserves and where state-owned utility Eskom's coal-fired power plants are found. More than 2 200 South Africans are killed each year due to air pollution, with thousands of cases of bronchitis and asthma reported in adults and children. This costs the country more than R 30 billion (US$ 1.69 billion) each year through hospital admissions and lost working days. In addition, there is a push for exploration of fossil fuels, as seen by the Draft Gas Masterplan issued for comments in 2024.

On the other hand, there has in recent years been a positive trend in renewable energy projects, with the country approving licences for IPPs through its Renewable Energy Independent Power Producer Procurement Programme (REI4P). By 2019, 106 IPPs added 3.8 GW of renewable energy to the national grid. However, the REI4P has also been used to produce fossil fuels (1 005 MW from two open cycle gas turbine peaking plants) and has done little to disrupt Eskom's monopoly position, as all IPPs are obliged to sell their electricity to Eskom. Moreover, there are strong indications that most IPPs are owned by entities from foreign countries, including Norway, Spain and France. Few IPPs are owned by South African shareholders.



OUTLOOK FOR SOUTH AFRICA'S JUST TRANSITION

South Africa has ample renewable energy resources to exploit – however, progress has been slow

South Africa has sufficient renewable energy resources to provide 70% of the electrical demand by 2050. The country is among the top three in the world for solar projects, with 2 500 hours of sunshine per year at a radiation levels of 4.5 to 6.6 kWh/m^2. This bounty, coupled with a decline in the cost of renewable energy installations, encouraged households and businesses to install solar panels to mitigate the impacts of loadshedding. By June 2023, rooftop solar in South Africa totalled about 4 412 MW.

In terms of its wind resources, more than 80% of its land area has wind resources that could support the development of wind farms that could add 6 700 GW of intermittent power to the national grid. Biomass, although already used, could be used more efficiently. Mini hydropower could be developed locally, and South Africa could also potentially benefit from wave power along its extensive coastline. However, achieving high levels of renewables will be challenging for South Africa because of the high capital investment required and because of Eskom's existing debt burden, which the state has had no choice but to take on in part.

The country's legislative and administrative landscape supports a just transition

South Africa has adopted several policy and legislative instruments and institutional arrangements to transition the country to a lower-carbon future. These include the recently signed Climate Change Act, a carbon tax and measures to mandate new renewable energy capacity (such as the introduction of a renewable energy feed-in tariff). In addition, effort has been made to reduce administrative roadblocks around renewable energy projects and to invest public funds in renewable energy research and development.

The passing of the Electricity Regulation Amendment Act of 2024 introduced major reforms to South Africa's energy sector. Specifically, the new state-owned Transmission System Operator SOC Ltd will manage a competitive electricity trading platform, marking a significant shift toward liberalising the energy market and reducing Eskom's monopoly.

Despite these favourable policies, there remain internal divisions within government about the pace and shape of the low-carbon transition. These were especially acute when the Ministry of Mineral Resources and Energy was a single entity. After the 2024 national elections, however, these two portfolios have been split into the Ministry of Electricity and Energy, and the Ministry of Mineral and Petroleum Resources.

The Just Transition Framework will help manage impacts on affected sectors

Some of South Africa's more powerful political forces, including mining and metalworker unions, have opposed privatised renewable energy out of the fear of losing jobs to renewable energy. In the context of an unequal, poverty-stricken society, this has been an obstacle to the rollout of renewable energy. To manage this, the Presidential Climate Commission collaboratively developed a Just Transition Framework that draws on the principles of distributive, restorative and procedural justice to shape actions to mitigate the impacts of the transition.

Active pursuit of oil and gas projects will slow the transition

Most of South Africa's crude oil (90%) and gas (74%) are imported. The country is now actively pursuing offshore oil and gas projects and has licensed exploration and production. Shale gas has also been found in the Karoo, raising concerns that the state will revisit plans for fracking in the area. The country has an active civil society sector that is likely to challenge such plans in court.

KEY FACTS

Zimbabwe's energy needs are met by traditional biomass and waste (46%), coal (22.8%), oil (23.6%) and hydropower (7.7%).

The country obtains electricity from hydropower, coal, biofuels and oil.

In 2022, 50.1% of the Zimbabwean population had access to electricity, weighted in favour of urban areas (89% access). This dropped to 33.7% in rural areas.

Zimbabwe aims to achieve 1 100 MW of generation from renewable energy (or 16.5%, whichever is higher) by 2025 and 2 100 MW of generation from renewable energy (or 26.5%, whichever is higher) by 2030.

With only 33.7% of rural residents having access to electricity, renewable energy presents an opportunity to expand electricity access

Zimbabwe

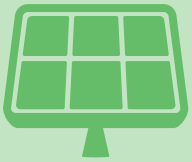
Most of Zimbabwe's energy still comes from burning traditional biomass or waste – an indication that the country experiences substantial energy poverty. With only 33.7% of rural residents having access to electricity, renewable energy presents an opportunity to expand electricity access without also increasing the country's carbon footprint – provided the right decisions are made now.

Zimbabwe's current electricity supply is dominated by two hydropower stations on the Zambezi River and four coal-fired power stations, of which three were built in the 1950s and are only able to deliver a fraction of their installed capacity.

Plans to build two new coal-fired power plants ran aground in 2021 after the Chinese government declared that it would stop financing overseas coal projects. A network of local, regional and global civil society organisations also objected to the building of one of the power stations on the grounds of climate change concerns and local community impacts due to pollution, displacement and environmental degradation.

Zimbabwe's key remaining energy infrastructure project is the 2 400 MW Batoka Gorge hydropower project on the border with Zambia, which involves building a massive 40-square-kilometre reservoir. Construction on this project started in June 2019 and stalled during the Covid-19 pandemic. Now the project is being opposed on environmental grounds because the dam will reportedly back up to within 650 m of Victoria Falls, a World Heritage site, which could contravene UNESCO restrictions. There are also concerns that the project will destroy numerous tourism-based livelihood opportunities associated with the pristine Batoka Gorge. The wisdom of installing hydropower in the context of a changing climate is also questionable, considering how critically low water levels at the Kariba dam hydropower station have led to extensive power cuts across the country.

Solar's current contribution to the energy mix is negligible. Three solar stations totalling 222 MW are active and a further two totalling 150 MW are planned. One 1.2 MW mini-hydro station is currently in the works.



OUTLOOK FOR ZIMBABWE'S JUST TRANSITION

Zimbabwe has excellent solar potential and is already exploring small hydro potential

More than 70% of Zimbabwe's land area exceeds the world average for solar generation per unit of installed capacity. Its technical hydropower potential is 17 500 GWh per year, of which 20% is currently exploited through the Kariba scheme. A number of sites for micro-hydropower have been identified. However, its biomass and wind potential fall below world averages.

Comprehensive policies to support a just transition are in place

Zimbabwe's policy and legislative framework for the Just Energy Transition includes the Climate Change Policy (2017) and a National Renewable Energy Policy (2019). While the Climate Change Policy makes no mention of a "just transition", the 2019 National Renewable Energy Policy is more comprehensive, emphasising the basic right of every Zimbabwean to economic and social development and the need for affordable green energy options while increasing energy access. It also highlights gender equality and equity as necessary for the country's development and acknowledges that the availability of energy in rural communities – including in the form of solar water heaters and biogas digesters – will unlock their productive capacity. To this end, the policy promotes off-grid technologies and other clean solutions in regions where traditional grid extension is not economically feasible.

To improve the roll-out of these technologies, the National Renewable Energy Policy advocates for specific quality standards, procurement methods and financing. It also identifies quantitative indicators for measuring the extent to which renewable energy projects are improving socio-economic conditions in Zimbabwe. For example, it specifies that at least 40% of the workforce employed in the running of the renewable energy plant must come from local communities.

Licensing structures allow for IPPs to supply directly to the public

One of the functions of the Zimbabwe Electricity Regulatory Commission is to issue generation, transmission and distribution or retail supply licences. A generation licence enables the holder to sell electricity to any transmission, distribution or supply licensee who purchases electricity for resale. With the Commission's approval, the holder can also sell to customers directly. In other words, the holder of a generation licence is not legally obliged to sell electricity to the Zimbabwe Electricity Transmission and Distribution Company, paving the way for peer-to-peer electricity trading, which could drive renewables rollout while enhancing electricity access.

New interest in oil and gas is a concern

Zimbabwe is not known as an oil or gas player, but in September 2022, drilling for gas commenced on the first of two wells in the Cahora Bassa Basin in northern Zimbabwe.

A call to action for policy makers

1. ADDRESS GOVERNANCE CHALLENGES

Despite their fossil-fuel-expansion plans, all the countries surveyed have committed to renewable energy targets, either in their energy policies or in their updated Nationally Determined Contributions, which all countries but Botswana have submitted (Botswana's last submission was in 2016).

The countries surveyed have also all achieved some level of separation between energy regulation, planning and operation, although there are differences in the pace of unbundling unwieldy, vertically integrated state-owned electricity entities and allowing private sector participation. In Madagascar, for example, the energy sector has been liberalised since 1999, while Angola took this step in 2015. Legal reforms to unbundle state-owned electricity utilities and promote a competitive energy market have only recently gathered pace in Mozambique and South Africa. And in Botswana, Namibia and Zimbabwe, vertically integrated public utilities still loom large.

Several countries have enacted policy and legislation to encourage private investment in off-grid solutions. In Madagascar, a consumer tax was introduced to fund the Rural Electrification Agency, which helps to co-sponsor rural electrification projects. In Mozambique, the Regulation for Energy Access in Off-grid Areas (Decree No. 93) offers the private sector a clearer and more transparent process for implementing off-grid electrification projects. And in Namibia, the Interim Renewable Energy Feed-in Tariff programme encourages smaller-scale electricity end users to invest in their own electricity generation and storage capacities, mostly in the form of solar photovoltaic installations for commercial and residential applications.

Namibia and Zimbabwe have high-level committees that allow for private or civil society participation in decision-making on the country's low-carbon development path. However, with the exception of South Africa, none of the surveyed countries have established a specific process or dedicated institutions to oversee a just transition. Establishing such institutions would help countries remain on track with their decarbonisation policies and objectives.

2. CLOSE THE RURAL-URBAN ENERGY GAP

All countries assessed have significant disparities in the electrification rates for rural and urban populations. These exist in Angola (urban: 76.2%; rural 7.3%), Botswana (urban: 95%; rural: 25%), Mozambique (urban: 79.4%; rural: 5%), Madagascar (urban: 71.6%; rural: <11%) and Zimbabwe (urban: 89%; rural 33.7%). Namibia has the lowest rates of disparity, with those living in urban areas having an electrification rate of 74.8% and people living in rural areas 33.2%. South Africa's electrification rate of 87.1% in urban areas and 93.4% in rural areas is an anomaly driven by burgeoning informal settlements around primary and secondary cities and towns.

That none of the countries assessed has universal access to electricity is a travesty. This is especially true for Angola and Mozambique, who both display particularly low levels of electrification while being richly endowed with renewable energy.

3. HARNESS RENEWABLES

All the countries included in the survey have massive renewable energy potential that remains largely untapped. In Angola, a renewable mapping exercise found that the country has 18 GW of hydropower, 16.3 GW of solar power and 3.9 GW wind power. Botswana has more than 3,200 hours of sunshine per year. Madagascar has considerable solar potential – more than 2,800 hours of sunlight per year – and 2 GW of wind resources. Mozambique has 4.5 GW of potential wind power and more than 2.7 GW of solar potential. Namibia has one of the best solar irradiation regimes in the world, suitable for both solar electricity generation and solar thermal applications. South Africa has 2,500 hours of sunshine per year at a radiation level of 4.5 to 6.6 kWh/m^2 and over 80% of its land area has wind resources that could support the development of economic wind farms. More than 70% of Zimbabwe's land area far exceeds the world average for generation per unit of installed photovoltaic capacity. Harnessing these sources of renewable energy would amply meet the goal of universal electricity access in the region. However, with this expansion of renewables, there need to be proper environmental, economic, social and cultural assessments done with the rights of Indigenous Peoples and communities being paramount.

STATES AND DECISION MAKERS SHOULD FUTURE PROOF

Energy decision making should encompass energy justice which recognises the need for the sustainable use of all energy sources and improving justice throughout the energy life cycle for each energy source.

Energy policy needs to adhere to energy justice to ensure that decision makers are future-proofing according to scholars RJ Heffron and L De Fontelle[2]. Future proofing entails that a decision maker can state that at the point of making a decision, they relied on best practices including scientific data, risk management strategy, environmental impact data and consider alternatives. Should future-proofing not be done, this could lead to decision makers being held liable.

An energy justice lens puts distributive, procedural, recognition, and restorative justice principles at the heart of all energy policy decision-making.[3] According to one of the mainstream ways of thinking about energy justice, these principles are:[4]

NE	Description
Availability	People deserve sufficient energy resources of high quality
Accessibility	All people, including the poor, should be able to purchase sufficient energy to secure universal enabling access[5]
Due process	Countries should respect due process and human rights in their production and use of energy
Transparency and accountability	All people should have access to high quality information about energy and the environment, and fair, transparent, and accountable forms of energy decision-making
Sustainability	Energy resources should not be depleted too quickly
Intragenerational equity	All people have a right fairly to access energy services
Intergenerational equity	Future generations have a right to enjoy a good life undisturbed by the damage our energy systems inflict on the world today
Responsibility (cosmopolitanism)	All nations have a responsibility to protect the natural environment and minimize energy-related threats

2 https://www.tandfonline.com/doi/full/10.1080/02646811.2023.2186626
3 K Jenkins. et al "Energy justice: A conceptual review" (2016) Energy Research and Social Science 11 174–182.
4 Note 15 above.
5 See T Ledger & M Rampedi Hungry for Electricity (PARI, 2022); Monyei, C. et al 'Examining energy sufficiency and energy mobility in the global south through the energy justice framework' (2018) Energy Policy 119 68–76.

JUST ENERGY TRANSITION DASHBOARD

Assessing Southern African countries' progress towards a just transition

Angola	Botswana	Madagascar	Mozambique	Namibia	South Africa	Zimbabwe
INSTALLED % RENEWABLE ENERGY CAPACITY (HYDROPOWER)						
50-75%	<25%	25-50%	75-100%	<25%	<25%	50-75%
INSTALLED % NON-HYDROPOWER RENEWABLE ENERGY CAPACITY						
<25%	N/A	<25%	<25%	N/A	N/A	<25%
RENEWABLE ENERGY ELECTRIFICATION TREND						
Positive	Positive	Negative	Positive	Positive	Negative	Positive
TRANSPORT: % ELECTRIFICATION						
<25%	N/A	N/A	<25%	N/A	<25%	<25%
ENERGY INTENSITY OF THE ECONOMY						
Low (2.9)	Low (2.9)	Average	Very high	Low	Very high	Very high
ELECTRIFICATION RATE: URBAN						
25-50%	75-100%	50-75%	50-75%	50-75%	75-100%	75-100%
ELECTRIFICATION RATE: RURAL						
<25%	25-50%	<25%	<25%	25-50%	50-75%	25-50%
ESTIMATED POPULACE WITHOUT GRID-BASED ELECTRICITY						
>16 million (half the Angolan population)	N/A	>19 million without reliable electricity	20 million without reliable electricity	300 000	3 million	Over 10 million without access to the national electric grid.
ELECTRICITY SUPPLY INTERRUPTIONS						
Almost daily	Frequent	Frequent	Almost daily	Frequent	Almost daily	Almost daily
EXTERNALITIES OF CURRENT ENERGY GENERATION SYSTEM						
Wide-ranging	Wide-ranging	Localised	Wide-ranging	Localised	Extensive	Wide-ranging
SEPARATION OF ELECTRICITY OPERATION, REGULATION AND PLANNING						
Achieved	Achieved	Not achieved	Achieved	Nearly achieved	Nearly achieved	Achieved
DIVERSE PARTICIPATION IN ENERGY MARKETS						
State operator, some private participation	State operator, some private participation	State operator, some private participation	State operator, some private participation	State operator, some private participation	State operator, some private participation	State operator, some private participation
UNBUNDLING OF GENERATION, TRANSMISSION AND DISTRIBUTION						
Achieved	Not achieved	Not achieved	Not achieved	Partially achieved	Not achieved	Partially achieved