

Green from the Ground Up: A path towards Sustainable Development in Africa

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The validity of climate change is no longer a contested topic. Overwhelming data has recorded temperature anomalies, natural disasters, and melting glaciers, and the once prevalent denials of anthropogenic climate change have quieted down. With nearly unanimous acceptance of climate change, many societies are aware of the urgency of decarbonisation and have initiated the complex, unprecedented energy transition. The energy transition is defined as the global energy sector's shift from fossil-based energy sources, like oil, natural gas and coal, to renewable ones, like wind and solar. With the first UNFCCC climate conference in Rio de Janeiro in 1992, climate change has been on the agendas of industrialized countries for more than 30 years. The commitments grew from country-specific ones like the Kyoto Protocol, to global goals, like limiting global temperature rises to a maximum of two degrees, as stated in the Paris Agreement. Over the following years, there were further Conferences of the Parties (COP) that have been described as important steps in the fight against climate change. Western nations have pledged a climate action position that

seems to increase in intensity each year and these intentions to decarbonise are real and actionable, with technology and funding growing rapidly to support this large-scale transition. Even so, a key takeaway from COP28 last December is that progress has been slow and countries were urged to increase their emission mitigation efforts. Global greenhouse gas emissions have remained high and are not simmering down. Climate action is not only a priority for rich countries. The threat that industrially developing countries will become big harmful polluters is a topic that has become increasingly focal in global climate conferences. Emerging markets, however, face a transition with more precariousness; it is much easier to uproot the energy foundation of a nation's economy when it is already an economic powerhouse. Developing nations are tasked with an energy transition that differs substantially from Western countries, as green energy will be a *means* to development, rather than an afterthought. Even though much of the Global South is developing climate action plans, this is often coupled with even quicker economic growth, allowing greenhouse gas emissions to mushroom in emerging economies. Take the expanding economies of Southeast Asia, which are expected to increase emissions by one third by 2050 (Asia Development Bank). Coal remains the primary energy source in Malaysia, Indonesia, and the Philippines. India is the world's fastest growing economy and expected to see higher and higher demand for energy. The need for fast-paced economic growth in the Global South indicates an energy transition that is starkly different from countries that are merely trying to sustain low and steady growth. Aiding developing countries in their transition has been increasingly important in global climate conferences.

Significant foreign aid has been allocated to advancing the energy transition abroad, not only to reduce global emissions, but also to advance broader sustainable development. Yet numerous studies report that only a fraction of the promised aid actually has been deployed, indicating that an intentional synthesis of internal initiatives and external aid are needed. However, the question of how to develop the energy transition in the developing world is an incredibly complex one, and lies at the intersection of a number of elements: politics, finance, technology, inequalities, and even philosophy: the question alone, of whether rich nations are *entitled* to advance green energy overseas, is highly contested, considering that these industrialized countries built their economies on the rampant combustion of fossil fuels. While the damage enacted in the past is irreversible, there remains hope for models of economic development that create wealth and abundance not at the expense of the natural environment, but by harnessing the environment's natural regenerative energy, sustaining the planet and its people in harmony.

Why Africa?

The energy transition in the developing world is especially urgent to discuss in Africa. Although African countries range greatly in terms of cultural, political, and economic structures, there is a high concentration of countries with low electricity access and low GDP per capita. At the same time, many countries are rich in land, sunlight, or coastline, making the continent a massive opportunity for renewable energy development. In fact, the continent is considered to have 60% of the world's best solar resources, yet only 1% of

global solar photovoltaic capacity (Moss, 2024). Solar opportunities are massively untapped.

In addition, Africa is one of the regions most vulnerable to climate change. This is a saddening reality considering that the continent contributes a negligible 2 to 3 percent of global greenhouse gas emissions, yet must face significant collateral damage from other global polluters (UNEP). Africa's unique vulnerability stems from their large reliance on subsistence farming and other weather-dependent activities like fishing and herding. In addition, impoverished regions are generally less well-equipped for natural disasters, economic disruptions, or other environmental risks, purely due to the fact that there are less tools and finances available (African Development Bank Group).

This is why the energy transition is an urgent topic in African countries and other nations with similar characteristics. In such regions, it is less so a matter of transitioning from non-renewable to renewable sources, but of building economies upon green energy in the first place. This is largely unprecedented; nearly every country has become a strong player in the global economy through the exploitation of fossil fuels. With this in mind, a prevalent argument is that African nations are actually entitled to follow the tried-and-true path to development: cut down forests, build factories, and burn coal without a thought for the environmental repercussions. Green energy, it seems, does not need to be a national priority for most African countries. Especially for the nations that are still tackling tasks like making clean drinking water or mosquito nets accessible to citizens, the construction of a wind farm seems to be a nonessential project. However, the energy transition in Africa extends beyond ecological sustainability concerns. At its core, the energy transi-

tion is about expanding access to electricity, improving health and sanitation, and creating jobs. If effectuated intentionally, the continent's green energy transition could actually *combat* the most pressing issues, not neglect them.

Energy Poverty

Many African countries have unreliable, spotty, or no access to energy at all. To put things into perspective, average energy consumption per person in sub-Saharan Africa, excluding South Africa, is 185 kilowatt-hours, compared to 12,000 kWh in the United States. Put differently, most people in Africa use less electricity than an average American household's refrigerator in a year (The Economist). Of course, there is a large degree of heterogeneity in energy access across the continent. South Africa and Northern African countries have the highest energy access. Countries like Ghana and Kenya have been working to expand access and have ambitious plans to achieve full energy access by 2030. Central African countries, like South Sudan and Chad suffer from the lowest levels of access, averaging around 10

Energy access must be an instrumental part of Africa's sustainable development for a number of reasons. First, energy plays an important role in the home. For instance, 920 million Africans lack access to clean cooking (McKinsey). Households without access to clean energy often use traditional cooking methods like burning wood, charcoal, and animal dung in open fires. These methods produce high levels of indoor air pollution, exposing individuals, predominantly women and children, to harmful particulate matter and toxic fumes. Studies in Kenya and Ghana have demonstrated clear

links between the adoption of clean cooking practices and reductions in respiratory infections (Lancet Planetary Health). Hence, energy access does not merely make life easier, it directly combats the very issues that harm households and communities the most. Health problems play an instrumental role in poverty cycles; sicknesses prevent individuals from going to work or school, incur health expenses, and may require family members to stay home and provide care, further limiting education or household income. Energy access, therefore, directly alleviates prevalent health issues, which is often cited as a primary inhibitor to African nations' development.

Outside of the household too, energy access crucially supports employment and industrialization opportunities. A report by the International Finance Corporation (IFC) highlights that improving energy access in sub-Saharan Africa could lead to a significant increase in GDP growth rates and the generation of millions of new jobs. This is largely because companies throughout Africa are hindered by energy poverty; in 2019, Energy for Growth found that 78% of African firms experienced power cuts in the past year and 41% said that electricity was a major constraint. Kenya and Nigeria have witnessed substantial economic benefits from improved energy infrastructure, with increased investments and growth in SMEs. Public institutions too, like hospitals and schools, clearly benefit substantially from greater energy access. Improving the standard of schools would not only equip students with a better level of education, but also incentivize uneducated youth to receive education, especially young girls who opt out of school to support their households. Hence, the expansion of electricity will largely create opportunities within the private and public sector alike.

Energy access is a basic need that can and must be met by all households, businesses, and public institutions. It is not a goal that is independent of sanitary, economic, or educational pursuits, but rather a means to achieving those wide-ranging social and economic goals. But even given that energy is key to sustainable development, why green energy? If lives can be saved and households uplifted through the expansion of energy, one may argue that the source of energy is a secondary matter. Moreover, renewables are oftentimes not considered to be cheap or scalable enough, making them less suitable for such a pressing global priority.

In reality, there is no clear answer, as each country is unique. Coal or gas plants are cheaper to build in the short-term but require continual costs from buying fuel, whereas solar or wind projects require more funding and land to build, but then accrue significantly less costs over time (The Economist). This indicates that, when taking a long term view, green energy is not only environmentally sustainable but economically sustainable too. While the global economy is still burning fossil fuels gainfully, we are in the final stages of profitability. Nonrenewable energy faces ever increasing costs of capital, whereas green energy is constantly receiving investment and will only expand in the long-term (Hartzmark and Shue, 2023). The carbon credit system is further incentivizing firms to go green. This system, in essence, financially penalizes firms for their greenhouse gas emissions and then uses this funding to offset their emissions. Such developments have enabled renewables to become increasingly affordable, and long-term energy access plans must consider the increasing profitability of renewables. Especially in Africa, it seems that the construction and subsequent

deconstruction of a fossil-based system would create pandemonium, not sustain stable and long-term development. Even so, many developing, at-risk economies face financial constraints or limited natural resources, and in some cases fossil fuels must be used in the short-term, as the expansion of energy is too critical.

Country-specific Pathways

Urgent energy needs coupled with green energy's financial and environmental sustainability make it clear that understanding and advancing the energy transition in Africa is of primary importance. The continent has abundant sunshine and coastline, making solar and hydropower opportunities abundant. Yet the expansion of renewables in Africa remains slow and underfunded. This is largely because, on a global scale, the scaling of renewables has been marginal and unequal. Even though global investment has been substantial, with worldwide clean energy investment of USD 1.7 trillion in 2023, these funds are not flowing to developing economies equally. The majority of the capital is being invested in three emerging markets: China, India, and Brazil. In 2022, China alone installed 100 GW of new solar photovoltaic capacity, nearly ten times as much as the 11 GW of operating solar capacity in all of Africa (Moss, 2024).

In the discussion about Africa's possibilities in the energy transition it is important to keep in mind the country-specific conditions. For each country, development and climate goals must be properly aligned. Mulugetta et al. (2023) highlight that "each country faces a distinct solution space and set of uncertainties for using renewables or fossil fuels to meet its development objective" (p.1). The authors state that

renewable energy development in Africa is economically and technologically feasible, but the country-specific pathways of achieving this transition are characterized by a wide range of possibilities and corresponding uncertainties. While clean and sustainable energy systems with universal access are the common ultimate goal of African countries, each country has a specific initial situation and resources, which are seen as the starting point for planning.

Hence, we will take a closer look at the state of energy systems in Africa by considering four models, which were initially suggested by Mulugetta et al. (2023) as archetype situations that many African countries could be classified under. The first model includes countries that are tasked with transitioning from a rather established fossil fuel based system to a renewable one. Then, we will consider countries where renewables are feasible and attractive. Countries that fall under the third model are inclined to focus on fossil fuels for the time being. The final model includes at-risk, developing countries which are at the earliest stages of the energy question altogether, having to tackle grid access and choosing the adequate source for their energy needs. In order to understand the specific countries in depth, we have selected one country from each of the four models to represent the general situation with regards to the energy transition.

South Africa

South Africa is a representative example of an economically advanced African country with high energy access and large reliance on fossil fuels. Similarly, countries like Botswana, Morocco, and Egypt find themselves in a similar situation of transitioning from an established

fossil fuel based energy system to a renewable one. South Africa showed promising economic growth after the first decades of the end of the apartheid in 1994 and was able to provide citizens with energy access on a large scale. Given its relatively high degree of economic development and large natural resource deposits, the state-owned company ESKOM managed to improve the energy supply by heavily relying on the country's vast coal supplies, allowing the nation to achieve well over 80% grid access in all its provinces in 2018. However, under the corrupt presidency of Jacob Zuma (2009 - 2018), who was accused of nepotism and money laundering, ESKOM was run down and had to implement forced energy shutdowns because the energy supply could not be maintained.

This instability is not only apparent in the energy system; 2023 was characterized by decelerating growth compared to the previous year and the country's unemployment rate exceeded 32% in the first quarter of 2024. Hence, the President's state of the nation address in 2023 outlined that his top two priorities were restoring energy security and growing the economy and jobs. With these urgent goals, one of which is mere energy security, one might question whether the nation is even in a position to care about the green energy transition.

However, South Africa is developing a rather well-coordinated and systematic approach to addressing climate change and corresponding SDGs. In 2023, South Africa reported a steady increase in renewable energy use, expanded access to safe drinking water, and a reduction in CO2 emissions. More specifically, South Africa has reduced overall GHG emissions by about 20% from 2009 to 2020. And even though the coal sector remains dominant and renewables still

make up less than 2% of the energy mix, preliminary changes have taken place. PwC Reports "a decline in coal (-0.8%) and gas (-3.0%) usage while energy from wind (+16.7%) and hydroelectricity (+100.9%) increased significantly."

Nonetheless, coal is a large sector in the country, supporting thousands of jobs. With this in mind, South Africa is tasked with an energy transition that must be intentional and equitable. On one hand, the sustainable creation of jobs and a stable energy system must be a priority. On the other hand, a significant portion of the population is employed in the coal sector and care must be taken that these groups are supported and given opportunities in new, growing sectors. While the heavy reliance on coal and prevalent corruption complicate the transition, it also comes with upsides. For example, the lack of reliable power allowed for the emergence of opportunities for new players in the sustainable energy sector. Local initiatives, small businesses, and government programs have shown that low-cost renewables are feasible and can be deployed faster than fossil-fuel alternatives.

South Africa, like other African nations with an established nonrenewable energy system, is faced with an established reliance on fossil fuels, while observing low costs and promising opportunities in renewables, suggesting that a just transition will require tactical and careful planning.

Ethiopia

In terms of the energy mix, Ethiopia is in quite a different initial position to South Africa. While it also faces economic issues like strong inflation, grid access is highly limited and there is no strong established

fossil fuel based energy system. Rather, the nation has been ramping up renewables and is expected to remain on a green energy development pathway. Comparable transition paths, which are characterized by an expected high share of renewable energies, also apply to Kenya and Namibia.

The country has been on a resilient green energy path since the early 2000s and profited from strong economic growth for the last two decades. But not all economic indicators are looking promising for Ethiopia. While it is one of the fastest growing economies in the region, it also is one of the poorest, with a projected inflation rate of nearly 30% in 2023. The nation was largely consumed by internal conflict and drought which led to 20 Million citizens needing humanitarian aid in 2022. Given these circumstances, Ethiopia suffers from a financing gap for building up climate resilience and several of the energy projects commissioned have come to halt due to significant institutional and regulatory issues.

Nevertheless, Ethiopia has strong potential for renewable energy and has already begun to exploit its possibilities. The last two decades have seen considerable advances regarding the development of a sustainable energy supply, with the most popular initiative being the Grand Ethiopian Renaissance Dam. The project led to over 96% of the country's electricity being generated by hydropower. But, to put this into perspective, hydropower only accounts for around 3% of total energy consumption. Given the large proportion of the population lacking grid access, biofuels and waste make up around 88% of the country's total energy consumption. One issue, researchers have identified, is that often decision makers tend to favor large scale natural gas or hydropower projects that benefit a fraction of the

population, rather than working towards universal grid access via community-focused renewables projects. In the case of Ethiopia, Gebreslassie et al. (2022, p.1) point out that as long as grid access for the society as a whole is neglected, there hardly can be a just transition.

However, with the completion of the dam in 2020, the country now aims to ramp up solar, wind and geothermal capacities to diversify its energy generation and reach economic development objectives. With more decentralized energy and expansion to less populous regions, Ethiopia has the potential to successfully skip fossil fuels and directly supply the entire nation with renewable energy.

Mozambique

Having discussed countries that have established fossil fuel or renewable-based energy systems, there are also a number of African nations that are essentially deciding whether to exploit fossil fuel sources or focus on renewables. Mozambique, along with the Republic of the Congo, Mauritania, Nigeria and Senegal, all stand at a crossroads between transitioning directly towards renewables or focusing on fossil fuels first. Mozambique, directly neighboring South Africa, experienced strong economic growth over the last years but still remains one of the poorest countries in the world. Hence, Mozambique is yet another nation where energy planning is, at its core, an effort to induce economic growth and stability. Regarding the country's options for a green transition, the African Development Bank points out that the country must focus on private investment and bringing national institutions in line with international governance standards

in order to access global climate finance. According to the African Development Bank, this would create a more attractive investment environment and allow for implementing a debt-for-climate swap proposal, which offers an opportunity to tackle both debt and climate issues.

As for most other impoverished countries, grid access in Mozambique is a major objective. Currently only 40% of the population has access to electricity, resulting in biofuels and waste making up roughly 65% of the country's total energy supply. Other sources are oil (16%), hydropower (12%) and natural gas (7%). Natural gas is increasingly becoming the focus of the country. With export opportunities to Europe, China and other South African countries, as well as the possibility of strengthening the local economy, for example in the area of agriculture through nitrogen-based fertilizers, it offers significant short to medium-term development potential for the country's economy. Additionally, the construction of natural gas power plants requires comparably low initial investment and therefore becomes even more attractive for Mozambique. Reliance on natural gas, however, comes with risks, and is unlikely to be a long-term solution. For example, Europe's rush for natural gas is likely to be short-term and focusing on fossil fuels leads to further losses in export profits due to the EU's Carbon Border Adjustment Mechanism. The risks and potentials of expanding the focus on natural gas must therefore be based on a long-term assessment.

Nevertheless, respect for the autonomy of countries and their national development planning has been shown to be successful (e.g. South Africa). For Mozambique and the countries in similar positions, a temporary focus on natural gas might be a legiti-

mate strategy, as it could expand energy and stability to communities that are currently deficient. Especially if this puts the country in a position to drive forward the energy transition all the more intensively in the future.

Burkina Faso

Finally, some African countries find themselves in the earliest stages of the energy question, as some are rather focused on political stability or meeting the most basic humanitarian needs of citizens. We will look specifically at Burkina Faso, but Madagascar and most countries in the Sahel are still at the earliest stages of developing an energy system.

Recent international news about Burkina Faso has covered the country's political instability, as the ruling military junta and terrorist groups fight to occupy the nation. Given the precarious political situation of the country, the establishment of an energy system is in its infancy. With an electricity access of 20% for its total population and 5% for rural areas in 2020, Burkina Faso is one of the world's tail lights when it comes to electricity access. In the same year, only 11% of the population had access to clean cooking. Even so, by 2030, the country aims to achieve an electricity access share of 95% in urban areas and 50% in rural areas. For clean cooking, the target is 100% in urban areas and 65% in rural areas. The International Energy Agency reports for 2019 that the country's energy mix consists predominantly from biofuels and waste, with imported oil products making up one-third of the total energy supply.

In addition to the low level of grid access, it is also the cost of electricity generation, which at USD 0.20/kWh

is one of the most expensive in Africa, that highlights the critical state of the country's energy system. The precarious security situation in the country naturally also has an impact on the country's economy. After several mines had to close for security reasons, extraction activity fell 13.6% in 2022. In addition, the real GDP growth dropped from 6.9% in 2021 to 3.2% in 2022 and inflation rose to nearly 15%. However, the African Development Bank expects the country to stabilize over the coming years.

In addition to the recent security and economic challenges, the country remains highly vulnerable to climate change. This pressing issue is acknowledged by decision makers and the country has set intentions to reduce its GHG emissions and ramp up solar projects. However, also here financing is insufficient. The private sector faces several obstacles, like low availability of resources dedicated to green investment and a lack of awareness of how to access climate funds. The African Development Bank, therefore, suggests the country "should thus adopt green financial instruments such as green bonds to mobilize additional resources, adopt tax incentives to encourage green investment, and strengthen private capacity to design bankable ecological projects."

Facing these numerous obstacles, the country, as the first step, aims towards electricity access and clean cooking for its population, backed by a combination of solar and oil-based generation. This solution promises a faster increase of overall power supply for its population. The final pathway and the pace of the green energy transition, therefore, remains uncertain and mainly depends on the development of socioeconomic factors in the country.

Looking Forward

We have now addressed the African energy transition broadly and outlined the development situation in four different prototypes of African countries and their possible pathways in moving forward. On one hand, this has shown that, for almost all countries, a green energy transition is an opportunity for sustainable development and not just an agenda of goodwill enforced by Western decision makers. On the other hand, it becomes obvious that while the countries all face a number of similar challenges, the different starting positions and available endowments strongly influence and determine each country's ability to make a sustainable green energy transition that benefits the entire population.

Furthermore, it is notable that, even though the countries face several serious problems in for example economic or political terms, the urgency of combating climate change seems to be widely acknowledged in political agendas. It is therefore all the more regrettable that in many places the necessary funds are lacking. Especially, when this is due to administrative hurdles and complexity or slack when it comes to disbursement of pledged funds. For example, the Green Climate Funds, an operating entity of the UN-FCCC and the Paris Agreement, have almost 30bn USD pledged but only 3.8bn USD has been disbursed. Similarly, stalling programs like Scaling Solar, initiated by the private sector arm of the World Bank in 2015, show how a lack of transparency and accessibility in climate and development financing hamper the growth of renewables in African countries.

Overall, financing has shown to be a major obstacle for the green energy transition. Many African countries face the fundamental problem of being considered high

risk markets and therefore face high costs of capital. Additionally, private investment is hampered by low accessibility and availability of funds. Increasing accessibility could help significantly, not only by increasing the share of renewables in the energy supply but by expanding energy access altogether.

In addition to the mere financial issues, it is apparent that the pre-existing approaches to the African energy transition are limited in scope. Namely, the African Climate Foundation advocates for an energy transition that is uniquely African, rather than an approach from the outside looking in. To actualize this, they advocate for context-specific interventions guided by rigorous local research. Current analyses addressing the African energy transition apply little analytic rigor to local African economies. Most models are devised by non-African institutions and rely on data that is too broad, neglecting the distinctiveness and diversity of local markets. These very analyses play a substantial role in shaping climate policies and therefore must be updated and improved to ensure a progressive transition.

The Energy for Growth Hub advocates for more support for African institutions, the collection of more region-specific data, and improving the communication around the purpose of energy transition models. Each nation has distinctive resources, political landscapes, and cultural backdrops. For instance, solar potential is immense in the Saharan region but naturally less promising in rainforest-dense areas. Stable governance is also a necessary prerequisite for the successful implementation of policies, which is still lacking in countries like Burkina Faso, South Sudan, or Libya. Clearly a one-size-fits-all approach would be unsuitable, yet it is largely being taken due to a lack of data. Improving the evidence base in each country will enable decision

makers to devise data-backed, long-term transition plans. Overall, successful transitions are likely to be realized through the advancement of localized research coupled with planning that is closely aligned with each country's political and economic landscapes.

Another instrumental element of Africa's transition, according to the African Climate Foundation, is to halt viewing climate change as separate from economic development. Instead, the economic aspect of the energy transition must be brought to the forefront of planning development strategies in African countries. It has been outlined that energy poverty is a key hindrance to raising the living standard in homes and raising the entrepreneurial standard in the marketplace. Moreover, long-term, equitable energy transition plans will create employment opportunities while protecting vulnerable communities, like those currently employed in the coal sector. Devising climate action plans that directly address poverty and unemployment are capable of spurring long-term sustainable development in every sense of the word "sustainable."

Both environmental and economic sustainability have been emphasized, yet perhaps one of the most important things here is the social aspect. Even though measures like per capita GDP and employment rates are relevant, it is only because these measures correlate with more bountiful, meaningful lives for the human beings affected. Building African economies upon energy that is clean and regenerative will not only uplift the lives of so many citizens today, but also ensure that future generations will have a solid foundation upon which to build their lives. As the old proverb goes, "a society grows great when old men plant trees under whose shade they will never sit." Acknowledging that the energy transition is an

instrumental piece of Africa's sustainable development and subsequently pouring in the research, funding, and planning will create a future that is equitable, sustainable, and uplifting.

References

Sources

- Augier, Engel, H., Girancourt, Onyekweli, O. (2023, October 17). Green Energy in Africa presents significant investment opportunities. McKinsey Company. <https://www.mckinsey.com/capabilities/sustainability/our-insights/green-energy-in-africa-presents-significant-investment-opportunities>
- Biogas — Department: Energy — republic of South Africa. (n.d.-a). https://www.energy.gov.za/files/inep/inep_overview.html
- Burkina Faso - Countries Regions. IEA. (n.d.-a). <https://www.iea.org/countries/burkina-faso>
- Burkina Faso — African Development Bank Group. (n.d.-b). <https://www.afdb.org/en/countries/west-africa/burkina-faso>
- The Economist Newspaper. (n.d.). Africa will remain poor unless it uses more energy. The Economist. <https://www.economist.com/middle-east-and-africa/2022/11/03/africa-will-remain-poor-unless-it-uses-more-energy>
- Environment, U. (n.d.). Responding to climate change. UNEP. <https://www.unep.org/regions/africa/regional-initiatives/responding-climate-change>
- Ethiopia — African Development Bank Group - making a difference. (n.d.-c). <https://www.afdb.org/en/countries/east-africa/ethiopia>
- Ethiopia. CESET. (n.d.). <https://cesetproject.com/ethiopia>
- Ethiopia. World Bank. (n.d.). <https://www.worldbank.org/en/country/ethiopia>
- Gebreslassie, M. G., Cuvilas, C., Zalengera, C., To, L. S., Baptista, I., Robin, E., Bekele, G., Howe, L., Shenga, C., Macucule, D. A., Kirshner, J., Mulugetta, Y., Power, M., Robinson, S., Jones, D., Broto, V. C. (2022, May 16). Delivering an off-grid transition to sustainable energy in Ethiopia and Mozambique - energy, sustainability and Society. SpringerLink. <https://link.springer.com/article/10.1186/s13705-022-00348-2>
- Hartzmark, S. M., Shue, K. (2023, February 17). Counterproductive sustainable investing: The impact elasticity of brown and green firms. SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4359282
- IEA. (n.d.). South Africa - Countries Regions. IEA. <https://www.iea.org/countries/south-africa/energy-mix>
- Mission Approach: About the African Climate Foundation. The African Climate Foundation. (2024, June 13). <https://africanclimatefoundation.org/mission-and-approach/>
- Moss, T. (n.d.). Why isn't solar scaling in Africa? Asterisk RSS. <https://asteriskmag.com/issues/05/why-isnt-solar-scaling-in-africa>
- Mozambique - countries regions. IEA. (n.d.-b). <https://www.iea.org/countries/mozambique>
- Mozambique - country snapshot. Action on Poverty. (2021, October 24). <https://actiononpoverty.org/our-impact/where-we-work/mozambique/>
- Mulugetta, Y., Sokona, Y., Trotter, P. A., Fankhauser, S., Omukuti, J., Somavilla Croxatto, L., Steffen, B., Tesfamichael, M., Abraham, E., Adam, J.-P., Agbemabiese, L., Agutu, C., Aklilu, M. P., Alao, O., Batidzirai, B., Bekele, G., Dagnachew, A. G., Davidson, O., Denton, F., ... Yussuff, A. (2022). Africa needs context-relevant evidence to shape its clean energy future. *Nature Energy*, 7(11), 1015–1022. <https://doi.org/10.1038/s41560-022-01152-0>
- Myclimate. myclimate. (n.d.). <https://www.myclimate.org/en/information/faq/faq-detail/what-happens-at-a-climate-conference-1/>
- Power Africa in Burkina Faso: Power Africa. Archive - U.S. Agency for International Development. (2020, April 16). <https://2017-2020.usaid.gov/powerafrica/burkina-faso>
- PricewaterhouseCoopers. (n.d.). Net zero economy index 2022. PwC. <https://www.pwc.co.za/en/publications/net-zero-economy-index.html>
- Republic of mozambique — african development bank group. (n.d.-d). <https://www.afdb.org/en/countries/southern-africa/mozambique>

- South Africa unemployment rate. (n.d.). <https://tradingeconomics.com/south-africa/unemployment-rate>
- South Africa — African Development Bank Group - making a difference. (n.d.-e). <https://www.afdb.org/en/countries/southern-africa/south-africa>
- Southeast Asia and the economics of global climate change. (n.d.-f). <https://www.adb.org/sites/default/files/publication/178615/sea-economics-global-climate-stabilization.pdf>
- Sustainable development goals: Country report 2023. (n.d.-g). https://www.statssa.gov.za/MDG/SDG_Country_report.pdf
- Südafrika: Leben ohne Strom. (n.d.). Arte. Retrieved from <https://www.arte.tv/de/videos/114323-000-A/suedafrika-leben-ohne-strom/>.
- tagesschau.de. (2024, May 26). Chef der Militärjunta in Burkina Faso soll weitere fünf jahre regieren. tagesschau.de. <https://www.tagesschau.de/ausland/afrika/burkina-faso-militaerjunta-102.html>
- What is energy transition?. SP Global. (2024, April 5). <https://www.spglobal.com/en/research-insights/market-insights/what-is-energy-transition>
- Who decides Africa's net zero pathways? Five ways to fix how we model African Energy Transitions and why it matters for climate and development. Energy for Growth Hub. (2023, April 27). <https://energyforgrowth.org/article/who-decides-africas-net-zero-pathways/>