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Reframing Climate Justice for Development

Six principles for supporting inclusive and equitable energy transitions in low-emitting energy-poor African countries

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Executive Summary

Advancing inclusive and equitable energy transitions is one of this century's most vital global challenges, and one in which development finance will play a crucial role. References to justice and equity are widespread in international climate policy, and are increasingly being used by development organizations to guide their own work, including support for energy transitions.

But prevailing definitions of climate justice rarely fully capture the priorities, challenges and perspectives of low-emitting energy-poor countries, the vast majority of which are in sub-Saharan Africa. When applied to development policy, this gap risks prioritizing near-term emissions reductions over broader support for economic development and energy transformation, with comparatively little climate benefit. This could severely hinder poverty alleviation, development, and climate resilience — the very opposite of justice. We need energy transitions that are truly 'just and inclusive.'¹ What does this mean for development funders and financiers, and how should it drive their approach to supporting energy transitions in the lowest-income countries?

Why do we need to reframe climate justice for development?

- 1. Because low-emitting energy-poor countries face unique challenges:** Since they are energy-poor, they produce extremely low emissions per capita. Power is often too unreliable and expensive to enable job creation. These countries have contributed very little to climate change, but are among the most vulnerable to its impacts.
- 2. Because prevailing definitions of climate justice rarely address energy poverty:** Terms like 'environmental justice,' 'climate justice,' the 'just transition,' and 'common but differentiated responsibilities and respective capabilities' are important and valuable. But few of them address energy poverty explicitly or fully account for the ambitions of low-emitting energy-poor countries.
- 3. Because climate justice must achieve just and equitable energy outcomes:** In addition to decarbonization, energy transitions in low-emitting energy-poor countries must: [1] provide universal electricity access; [2] power job creation and economic diversification; [3] enhance climate resilience; and [4] set the stage for a prosperous low-carbon future.

We propose six basic principles to help development funders support inclusive and equitable energy transitions in the poorest countries:

- 1. Diversity:** Adopt flexible policies and country-specific approaches.
- 2. Agency:** Prioritize African-owned ambitions and plans, and align external support.
- 3. Ambition:** Aim much higher than universal household access.
- 4. Resilience:** Prioritize energy solutions for climate adaptation.
- 5. Innovation:** Invest in emerging solutions, but beware of naive 'leapfrogging.'
- 6. Equity:** Treat the remaining global carbon budget as a 'development budget.'

Climate policy must reflect and respond to the needs and ambitions of those most impacted, and integrate a wider variety of perspectives on the meaning of justice and fairness. These six principles will help chart a pathway for development funders to better support low-emitting energy-poor countries — and help secure the dignity and opportunity of billions currently shut out of international climate decision-making.

¹ The United Nations, "[Theme Report on Enabling SDGs Through Inclusive, Just Energy Transitions](#)," United Nations, 2021.

Three Reasons We Need to Reframe ‘Climate Justice’ for Development

Advancing inclusive and equitable energy transitions around the world is one of this century’s most vital challenges, and one in which development finance will play a crucial role. References to terms like ‘justice’ and ‘equity’ are widespread in international climate policy — and enshrined in foundational texts like the Rio Declaration on Environment and Development and the Paris Agreement. Their use is meant to ensure that climate policy accounts for disparities and the needs of vulnerable populations.

Increasingly, international organizations and development funders are using these concepts to guide their own climate-focused work, including their support for global energy transitions. But prevailing definitions of climate justice — as applied by western development funders — rarely capture the priorities, challenges and perspectives of low-emitting energy-poor countries, the vast majority of which are located in sub-Saharan Africa. This gap omits critical inputs and perspectives. And in the context of development policy, it risks driving a prioritization of near-term emissions reductions over broader, longer-term support for economic development and energy transformation, with comparatively little actual climate benefit. This approach could severely hinder countries’ abilities to alleviate poverty, achieve core development goals, and respond to the effects of climate — the very opposite of justice.

We need energy transitions that are truly ‘just and inclusive.’² What does this mean for development funders and financiers, and how should it drive their approach to supporting electricity transitions in the lowest-income countries?³

It will require a reframed conception of climate justice.

² The United Nations, “[Theme Report on Enabling SDGs Through Inclusive, Just Energy Transitions](#),” United Nations, 2021.

³ This paper addresses the electricity sector, but recognizes that both ‘energy poverty’ and the ‘energy transition’ encompass a much broader range of energy sub-sectors and important associated challenges.

1. Because Low-Emitting Energy-Poor Countries Face Unique Challenges.

Many poor countries, heavily concentrated in sub-Saharan Africa, emit very low per capita greenhouse gas emissions compared to the rest of the world — a disparity that largely reflects the depth of their energy poverty (Figure 1).

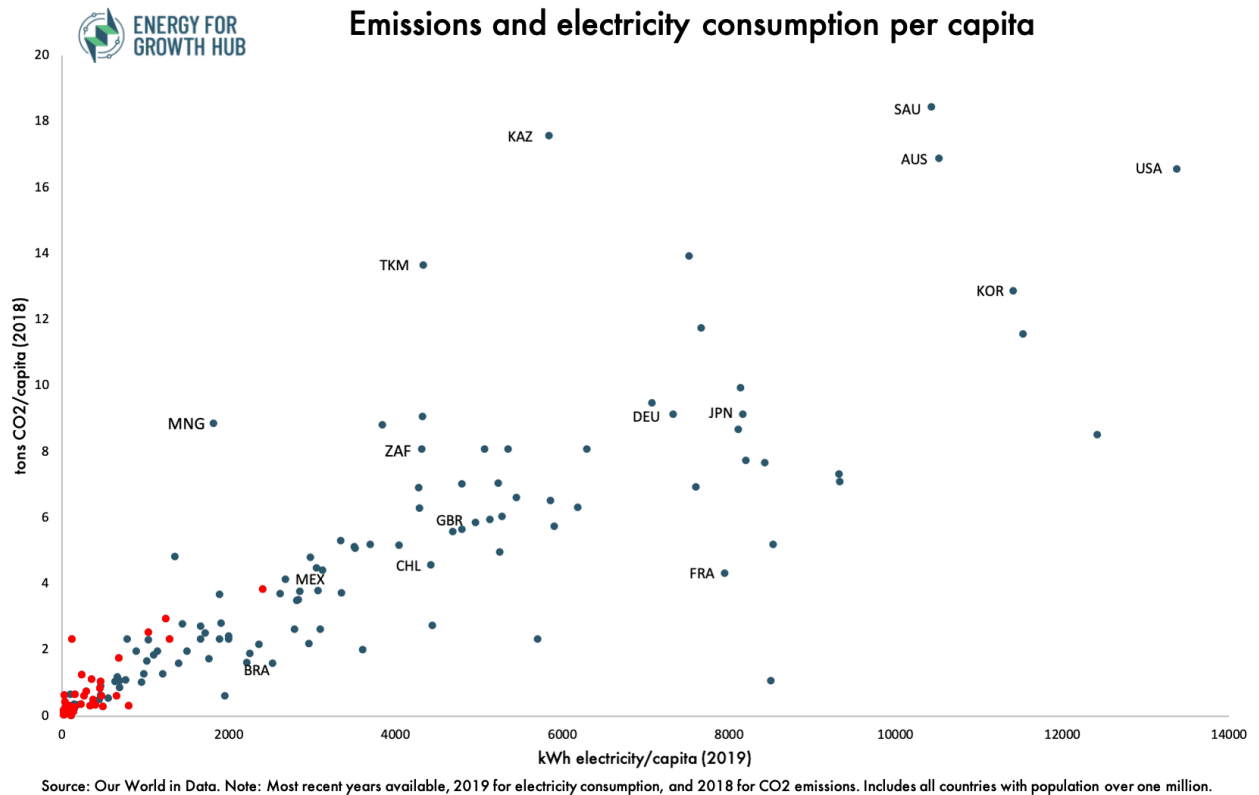


Figure 1: Emissions and electricity consumption per capita. At least 60 countries, the majority African (indicated in red), are crowded in the lower left corner, with low per capita emissions and very limited electricity consumption.

As of 2018, an estimated 789 million people — the vast majority in sub-Saharan Africa — lacked access to any modern electricity.⁴ Even in that region’s largest economies, average annual per capita electricity consumption is often under 200 kilowatt-hours (kWh) — less than what is needed to power a typical refrigerator.⁵ Each year, Californians use more electricity playing video games than does the entire country of Kenya.⁶

⁴ IEA, IRENA, UNSD, World Bank and WHO (2020), [Tracking SDG7: The Energy Progress Report](#).

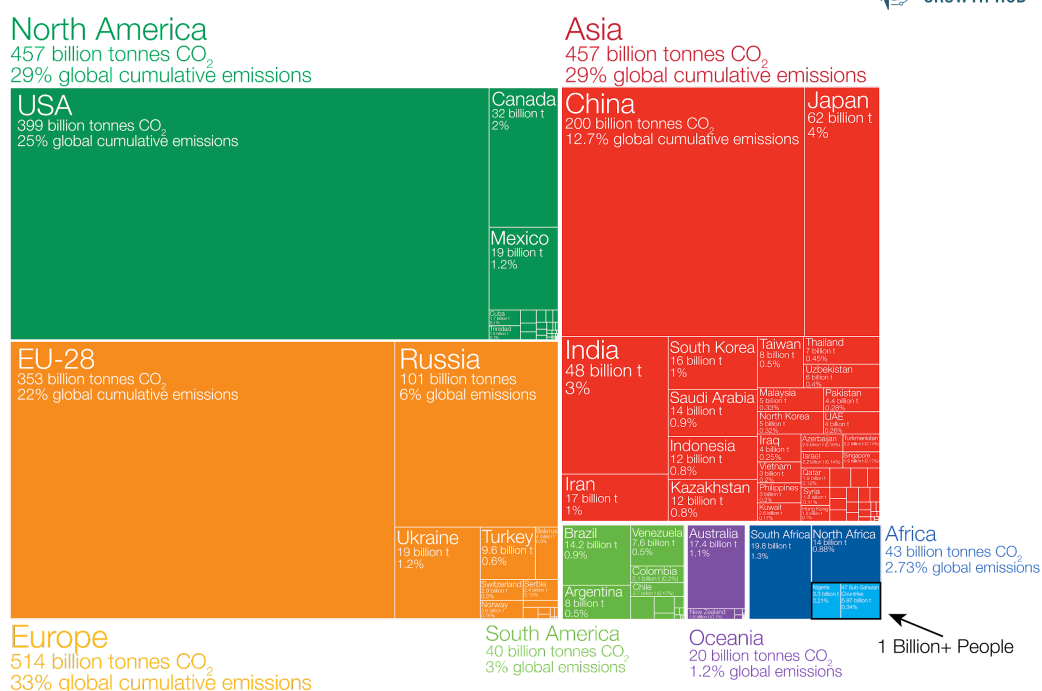
⁵ Todd Moss, [“My fridge versus Power Africa.”](#) Center for Global Development, September 9, 2013.

⁶ Todd Moss, [“Global energy inequality goes deeper than Bitcoin.”](#) OneZero, September 10, 2019.

Even for those with access, electricity is often too unreliable to power livelihoods or economic activity. Globally, the number of people without reliable power has been estimated at 3.45 billion — a figure that includes nearly the entire population of sub-Saharan Africa.⁷ Despite the lack of quality, the unit cost of electricity in some countries far exceeds the global average: in Liberia, for example, electricity is roughly four times as expensive as it is in the US.⁸ And in countries where the state subsidizes power to keep prices relatively low, unreliability and the resulting reliance on back-up diesel generators pushes real-world costs far higher.⁹

These countries have contributed essentially nothing to climate change. The 48 sub-Saharan African countries outside of South Africa, now collectively home to more than one billion people, are responsible for just 0.55% of cumulative CO₂ emissions (Figure 2).¹⁰ But they rank among the most vulnerable to its effects: populations in sub-Saharan Africa face extreme weather, rising temperatures, and increased risk of prolonged, repeated droughts — which are already having significant economic, social, and security impacts.¹¹

Who has contributed most to global CO₂ emissions?



Cumulative carbon dioxide (CO₂) emissions over the period from 1751 to 2017. Figures are based on production-based emissions which measure CO₂ produced domestically from fossil fuel combustion and cement, and do not correct for emissions embedded in trade (i.e. consumption based). Emissions from international travel are not included. Figures for the 28 countries in the European Union have been grouped as the 'EU-28' since international targets and negotiations are typically set as a collaborative target between EU countries. Values may not sum to 100% due to rounding. Data source: Calculated by Our World in Data based on data from the Global Carbon Project (GCP) and Carbon Dioxide Analysis Center (CDIAC). This visualization has been adapted with permission by the Energy for Growth Hub based on the original work by [OurWorldinData.org](https://ourworldindata.org).

Figure 2: Regional contributions to cumulative global CO₂ emissions (1751-2017).

⁷ John Ayaburi et al., "[Measuring 'Reasonably Reliable' access to electricity services](#)," *The Electricity Journal* 33(2020). This paper defines 'Reasonably reliable' electricity services as experiencing at most one hour of outage in a typical month.

⁸ Moussa Blimpo et al., "[Electricity Access in Sub-Saharan Africa: Uptake, Reliability and Complementary Factors for Economic Impact](#)," World Bank, 2019.

⁹ Todd Moss et al., "[The Reliability-Adjusted Cost of Electricity \(RACE\): A New Metric for the Fight Against Energy Poverty](#)," *Energy for Growth*, October 15, 2019.

¹⁰ Todd Moss, "[Infographic: What is Sub-Saharan Africa's Contribution to Global CO₂ Emissions?](#)" December 10, 2020.

¹¹ IPCC, [AR5 Climate Change 2014: Impacts, Adaptation, and Vulnerability, Chapter 3: Africa](#).

Because of their unique circumstances, energy transitions in these countries will inevitably differ from those in places like the United States or Europe — or even in the large emerging markets. Wealthy economies with universal electricity access, relatively flat demand, and extensive diversified power systems face a primary challenge of decarbonization. In contrast, low-emitting energy-poor countries must rapidly build out electricity systems to meet both basic needs and new challenges.

2. Because Prevailing Conceptions of ‘Climate Justice’ Rarely Address Energy Poverty.

Climate-focused policies adopted by development funders often focus on decarbonizing the power sector, for example through the prioritization or prohibition of financing for particular technologies. These decisions significantly impact development outcomes beyond the energy sector — particularly in poor countries where private capital is most constrained, and dependence on development finance is highest. Any ‘just’ climate-driven policy in this space should therefore target ‘just’ energy outcomes — yet many of the most commonly used terms to describe conceptions of justice and equity in the context of climate change fail to address energy poverty. This is a dynamic, globally diverse, and ever-evolving field, with robust and expanding African contributions. In very general terms, the most well-established concepts include:

- **Environmental racism and environmental justice.** These terms generally assert the universal right to equal protection and equal enforcement of environmental laws and regulations. They recognize that pollution and other environmental threats intersect with socioeconomic factors including race, class, and income disparity, and disproportionately harm vulnerable populations including people of color and Indigenous communities.¹²
- **Climate justice.** This concept draws on the movements against environmental racism and for environmental justice. It recognizes that climate change has disproportionately severe impacts on particularly vulnerable people and communities — including people of color, Indigenous groups, and the poor, reflecting systemic inequities. It includes debates over historic responsibility, and who has the greater capacity to act.¹³
- **Just transition.** This term evolved out of the US labor movement and refers most broadly to ensuring environmental sustainability alongside decent work, social

¹² For example: Robert Bullard, [“About Environmental Justice”](#); Rhuks Ako, *Environmental Justice in Developing Countries: Perspectives from Africa and Asia-Pacific*, Routledge: New York, 2013; Gordon Walker, *Environmental Justice: Concepts, Evidence, and Politics*, Routledge: London, 2011.

¹³ For example: United Nations, [“Climate Justice,”](#) May 31, 2019; Mary Robinson Foundation - Climate Justice, [“Principles of Climate Justice,”](#) 2015; Patrick Bond, “Climate Justice In, By, and For Africa”, in *Routledge Handbook of the Climate Change Movement*, Routledge: New York, 2014; [“Climate finance justice: International perspectives on climate policy, social justice, and capital,”](#) *Climatic Change* (2020) 161: 243-249.

inclusion and poverty eradication.¹⁴ In the climate context, where it is now embedded in the language of the Paris Agreement, it usually refers more specifically to safeguarding the wellbeing of fossil-fuel dependent communities and individuals during the process of decarbonization, with a significant focus on creating and maintaining high-quality jobs for those displaced by changing energy technologies.¹⁵

- **Common but differentiated responsibilities and respective capabilities.** This language has long been a feature of international climate policy, and is integrated throughout the Paris Agreement as the basis for equity considerations. It recognizes that countries' contributions to global emissions, as well as their capacities to respond, vary widely, and that an equitable international policy should account for this disparity.¹⁶

All of these concepts add value to global discourse and to our understanding of how climate change and efforts to address it affect people — but none of them fully account for the energy ambitions of low-emitting energy-poor countries. Both 'environmental justice' and 'climate justice' focus on the negative impacts of climate change and fossil fuel development — but neither consider the need to end energy poverty. The 'just transition' generally refers to the challenges of decarbonizing economies that are *already energy rich* and saddled with entrenched fossil fuel industries, particularly coal; in the African context, this only applies to a few countries. And all four concepts prioritize emissions mitigation, when analyses suggest that being primarily concerned with reducing emissions in the poorest countries is misplaced, as their emissions are likely to remain relatively small even with rapid economic development.^{17,18}

3. Because Climate Justice Must Achieve Just and Equitable Energy Outcomes.

An expanded definition of climate justice should include what's needed to advance *just and equitable energy outcomes*, particularly in low-emitting energy-poor economies. That means thinking about the energy transition as being about more than decarbonization. Four additional goals include:

1. Providing universal electricity access

The United Nations' Sustainable Development Goal 7 (SDG7) aims to ensure "access to affordable, reliable, sustainable and modern energy for all," a goal that has inspired and

¹⁴ For example: International Labour Organization, [Guidelines for a just transition towards environmentally sustainable economies and societies for all](#), 2015; Just Transition Center, [Just Transition: A Report for the OECD](#), May 2017; Just Transition Alliance, "[What is Just Transition?](#)"; Stockholm Environment Institute, "[A Just Transition](#)"; Center for Strategic & International Studies, "[Just Transitions: Lessons Learned in South Africa and Eastern Europe](#)," July 2020; International Institute for Sustainable Development, "[Just Transition](#)."

¹⁵ Matthew Henry, Morgan Bazilian and Chris Markuson, "[Just transitions: Histories and futures in a post-COVID world](#)," *Energy Research and Social Science*, 2020.

¹⁶ United Nations, [Paris Agreement](#), 2015.

¹⁷ Arthur Baker and Ian Mitchell, "[Projecting Global Emissions for Lower-Income Countries](#)," *Center for Global Development*, April 2020.

¹⁸ Lei Duan, Juan Moreno-Cruz, and Ken Caldeira, "[Balancing Climate and Development Goals](#)," *Environmental Research Letters* Vol. 15:12, December 15 2021.

reinforced international efforts including Lighting Africa, Power Africa, and SEforALL. Due in part to these initiatives and — more importantly — to concerted efforts and investments by the governments of countries like Côte d'Ivoire, Ethiopia, Ghana, Kenya, Rwanda, and Senegal, sub-Saharan Africa has made progress in expanding household access (Figure 3). Between 2014 and 2019, approximately 20 million Africans gained access to electricity annually — more than *double* the rate over the previous 13 years.¹⁹ Despite these impressive gains, however, the region's access rate remained below 50% in 2019. Helping everyone reach that first step on the energy ladder — basic access at home — remains an essential objective.

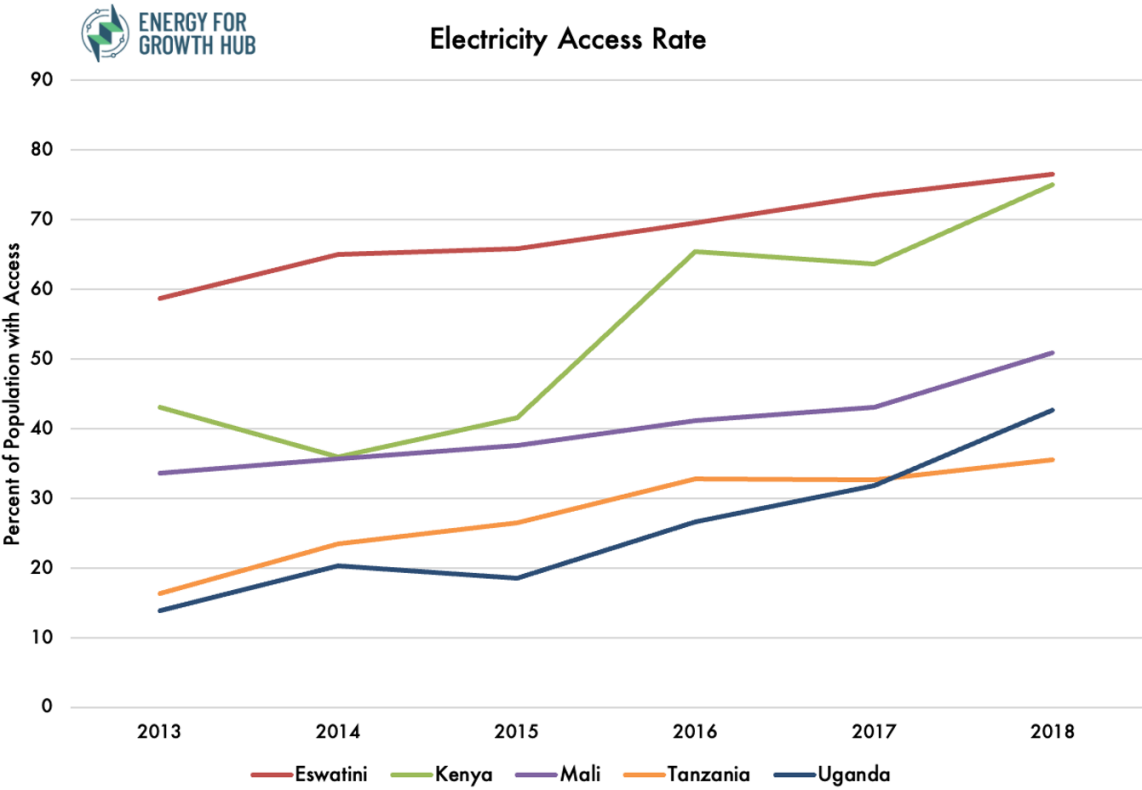


Figure 3: Growth in electricity access rates (2013-2018).

2. Powering job creation and economic diversification

While household access to electricity is essential, it is insufficient to end energy poverty. Most electricity used to generate income and power livelihoods is consumed outside the home.²⁰ And access to electricity means very little if service quality is poor. African firms consistently identify electricity cost and reliability as leading constraints to productivity, job creation, and economic expansion.²¹ In 2019, fewer than a third of African firms reported having access to

¹⁹ IEA, *SDG7: Data and Projections*, October 2020.

²⁰ IEA, *World Energy Balances*, 2019. Total global electricity is approximately 28% residential, 72% non-residential. An unweighted average of 138 countries is 34% residential, 66% non-residential and about three-quarters of countries fall within one standard deviation (~12%). These figures do not account for non-electricity energy use, such as industrial energy or transportation fuels. According to the US Department of Energy's EIA, residential electricity accounts for only 5% of global energy use.

²¹ World Bank *Enterprise Surveys*; See also Moss, Todd, " *Job Creation and Energy in Africa*," Energy for Growth Hub, 2018.

reliable power, driving those that can afford it to rely on diesel generators that pollute heavily, significantly increase operating costs, and create localized health impacts that disproportionately harm disadvantaged groups.^{22,23} Addressing these issues is therefore a prerequisite for employing Africa's growing population, which is increasingly urban and expected to double by 2050. Economic diversification, industrialization, and joining the digital economy will all require reliable, affordable, and abundant electricity outside the home.²⁴

3. Enhancing climate resilience

African countries already face severe climate impacts, which will continue to worsen. By 2040, the number of Africans in need of cooling will nearly double from 700 million to 1.2 billion, and residential cooling demand will increase by a factor of 20.²⁵ Climate adaptation solutions including cooling, desalination, and the construction of resilient infrastructure are energy-intensive and will require greater energy consumption. In addition, extreme weather events will likely negatively impact the reliability and performance of electricity infrastructure itself. Africa's energy transition will therefore need to include both significant increases in consumption and new approaches to sector planning and investment in order to build resilience to the current (and projected) effects of climate change.

4. Setting the stage for a prosperous low-carbon future

Many African countries already generate significant amounts of low-carbon electricity, and continue to increase their reliance on wind and solar. Between 2011 and 2020, Africa added nearly 26 gigawatts (GW) of renewable capacity, mostly in just the last few years.²⁶ In some countries, their renewable share far surpasses that of wealthy economies: for example, Kenya's electricity grid is already nearly 80% renewable. Continued support for renewable power will be critical. But the energy transition should help low-emitting energy-poor countries position themselves to take full advantage of emerging low-carbon technologies and industries — not only as consumers but as producers, manufacturers, developers and research hubs. This will require massive economy-wide investment in both technical and human capacity. While energy transitions present significant opportunities for job creation, they will also require new skills, training, and professional development services.²⁷

²² Moussa Blimpo et al., [Electricity Access in Sub-Saharan Africa: Uptake, Reliability and Complementary Factors for Economic Impact](#), World Bank, 2019.

²³ Yael Borofsky, "[The Love-Hate Relationship with Self-Generation](#)," Energy for Growth Hub, February 8, 2021.

²⁴ UN Department of Economic and Social Affairs, [World Population Prospects 2019](#); Zainab Usman and David Landry, [Economic Diversification in Africa: How and Why it Matters](#), Carnegie Endowment, 2021; African Union, [Agenda 2063: The Africa We Want](#) (Popular Version), 2016.

²⁵ International Energy Agency (IEA), [Africa Energy Outlook 2019](#), November 2019.

²⁶ International Renewable Energy Agency (IRENA), [Renewable Capacity Statistics 2021](#), 2021.

²⁷ United Nations, "[Theme Report: Enabling SDGs Through Inclusive, Just Energy Transitions](#)," 2021.

Six principles for supporting just and equitable energy transitions in low-emitting energy-poor countries

As international funders set policies and prioritize investments to support energy transitions across sub-Saharan Africa, they should consider the following principles and recommendations.

1. **Agency.** Prioritize African-owned ambitions and plans, and align support.

African countries are not passive recipients of climate and energy wisdom from the rich world. Many African governments have put forward their own plans to address both development and climate change, including at the regional level.²⁸ Many have laid out their own pathways for an energy transition, and development institutions should support them in determining and pursuing — through open, deliberative, and transparent processes — their own energy transition trajectories, based on assumptions and parameters that they define.²⁹ The degree to which international funders ultimately prescribe these visions contributes to a perceived lack of sovereignty and agency, and risks undermining the collaborative international coalition needed for long-term global decarbonization.

Recommendations for development partners:

- **Proactively integrate input and perspectives on justice from low-emitting energy-poor countries in policy design.** Funders should proactively integrate a wider variety of local perspectives on the relevant and evolving meanings of climate justice, including the growing movement for ‘energy justice’ in countries like Kenya, and their implications for development policy.³⁰
- **Align power sector support programs with country climate and development plans.** Use country-specific goals and plans as the starting point, and build programs that contribute to country-defined objectives. Determining whether and at what point to prioritize investment in generation, mitigation, or complementary assets will be difficult, and must be driven by country priorities.
- **Work with countries to help strengthen plans where appropriate.** In some cases, Nationally Determined Contributions do not fully align with power sector needs or development plans, or may present opportunities to increase ambition. In others, power sector plans can be strengthened. Development partners can play an important role in helping address these gaps, including by identifying further opportunities for innovation and providing associated resources.

²⁸ For example: African Union, [Agenda 2063: The Africa We Want](#); African Union, [Africa Mining Vision](#).

²⁹ Moussa Blimpo et al., [Electricity Access in Sub-Saharan Africa: Uptake, Reliability and Complementary Factors for Economic Impact](#), World Bank, 2019.

³⁰ Kariuki Muigua, “[Towards Energy Justice in Kenya](#),” February 2020; Franziska Muller, Manuel Neumann, Carsten Elsner, and Simone Claar, “Assessing African Energy Transitions: Renewable Energy Policies, Energy Justice, and SDG7,” *Politics and Governance*, 2021.

2. Diversity. Adopt flexible policies and country-specific approaches that reflect African economies' heterogeneous energy needs.

The continent is far from uniform. Neither 'Africa' nor 'sub-Saharan Africa' are particularly useful geographic units for projecting energy pathways or setting policy standards. South Africa and the six countries in North Africa account for two-thirds of the continent's total generation capacity, leaving just 81 GW for the remaining 48 countries and 1 billion people. South Africa accounts for 42% of sub-Saharan Africa's *entire* power generation capacity and 94% of its coal-fired capacity, and has a per capita electricity consumption rate more than 13 times greater than the rest of the region.

Each country's power sector has unique characteristics that determine the specific — and most urgent — priorities for its particular energy transition. For example, Senegal aims to shift away from its historical dependence on costly and inefficient heavy fuel oil by harnessing renewables and newly discovered indigenous gas resources; Kenya has achieved high access rates and a large renewable share, but is now struggling with grid instability and high prices; and hydropower-dependent Zambia faces severe climate-related energy security threats. The combination of technologies best suited to expand access, power economies, improve resilience, and support long-term decarbonization will therefore vary by country. Development partner policies that universally prohibit or prioritize support for specific technologies or approaches risk foregoing opportunities to assist where it matters most; risk pushing solutions that misalign with actual energy needs; and may severely limit meaningful support for countries that face relatively unique challenges.

Recommendations for development partners:

- **Resist outright bans on or universal prioritization of specific energy technologies or policy solutions.** Instead, adopt flexible tools that can support the deployment of diverse solutions that best match local conditions and needs.
- **Accept that low-carbon development pathways will vary widely.** The 'energy transition' is not a uniformly sequenced or structured checklist. Kenya's energy transition will not look like Germany's, or like Liberia's.

3. Ambition. Aim much higher than universal household access.

SDG7 is principally measured in terms of access to basic electricity at home, and the IEA defines modern electricity access as having been achieved once an individual's annual household consumption reaches 50 kWh per capita in rural areas and 100 kWh in urban centers.³¹ These metrics drive much of the international energy development agenda, placing a political premium on achieving universal access (regardless of quality or affordability) and setting a relatively low bar for consumption. But 50-100 kWh per year is barely sufficient to power several light bulbs for a few hours, charge a mobile phone, and occasionally run a small

³¹ IEA, [Defining Energy Access: 2019 Methodology](#) says "electricity access includes a household having an electricity supply connection, with a minimum level of consumption of 250 kilowatt-hours (kWh) per year for a rural household and 500 kWh for an urban household." To calculate per capita rates, we assume a household size of five.

fan.³² In fact, using cross-country trends, these rural and urban consumption levels correlate with incomes of just \$0.27 and \$0.57 per day, respectively. These metrics are helpful — but they are more akin to an *extreme energy poverty line* than an international target to promote development. Maintaining international focus on these limited goals risks undercutting African ambitions and settling for a level of electricity consumption much lower than development partners would ever willingly accept for themselves.

Recommendations for development partners:

- **Adopt metrics that make basic electricity access the first step, not the end goal.** Alternative metrics can help drive more ambitious policy. For example, the Modern Energy Minimum proposes to define the next threshold of access at 1,000 kWh per person per year, inclusive of both 300 kWh of household and 700 kWh of non-household electricity consumption.³³ This more ambitious energy target better aligns with development aspirations for employment, higher incomes, and economic transformation for emerging economies. The Modern Energy Minimum can be used to track progress against structural energy poverty — and for the next iteration of SDG7.

4. Resilience. Prioritize energy solutions for climate adaptation.

Development funders are increasingly prioritizing resilience, at least rhetorically. The Paris Agreement calls for climate finance to “achieve a balance between adaptation and mitigation,” taking into account the priorities and needs of developing countries.³⁴ However, despite the urgency of the adaptation challenge, wealthy countries have never fully come through on their commitments to provide the capital to address it. Finance for adaptation consistently lags behind that provided for mitigation: in 2013, adaptation finance comprised just 7% of international climate finance; as of 2018, it had risen to just 20%.³⁵ The lofty promise made by Annex 1 countries at the COP15 2009 Copenhagen Accord to mobilize a ‘new and additional’ \$100 billion per year in climate finance to developing countries has proven difficult to enact and track. And while the technologies and solutions important for resilience — including desalination and air conditioning — require significant energy inputs, energy finance is often considered primarily as a tool for mitigation, not adaptation.

Recommendations for development partners:

- **Meet (and exceed) stated commitments for adaptation finance — and ensure it is truly additional.** Funders *must* meet their committed obligations. Poor countries shouldn’t pay twice for climate change by suffering the worst of its effects while losing development financing that will help them adapt to mitigate a problem created by richer countries.

³² Morgan Bazilian & Roger Pielke, Jr. “[Making Energy Access Meaningful.](#)” *Issues in Science and Technology*, vol. 29, no. 4, 2013, pp. 74–78. JSTOR. See also Lauren Culver, “[Energy Poverty: What You Measure Matters.](#)” Stanford University, 2017 and “[More Than a Lightbulb: Five Recommendations to Make Modern Energy Access Meaningful for People and Prosperity.](#)” Center for Global Development, 2016.

³³ Todd Moss et al., “[The Modern Energy Minimum.](#)” The Energy for Growth Hub, September 30, 2020.

³⁴ United Nations, [Paris Agreement](#), 2015.

³⁵ Mizan Khan, et al., “[Twenty-five years of adaptation finance through a climate justice lens.](#)” *Climatic Change* 161, p. 251-269, 2020.

- **Support investment and planning for resilient electricity systems.** Severe weather and rising temperatures can have wide-ranging negative impacts on the resilience and performance of power systems. Alongside efforts to expand and improve supply, funders should work with countries to support forward-looking sector plans that account for and mitigate relevant climate risks, including for example efforts to expand the use of distributed systems and diversify supply.
- **Account for the additional electricity needed for climate adaptation.** Development partners should consider funding research to quantify the electricity requirements associated with climate adaptation, and work with countries to factor that data into projections of and support for future power needs. Development partners should also consider electricity itself as a tool for adaptation and resilience, and incorporate it into programs and policy decisions accordingly.

5. Innovation. Invest in cleantech that meets African needs, but beware of naive 'leapfrogging.'

Development funders and financiers have an important role to play in catalyzing private capital in lower-income markets and accelerating the deployment of advanced energy technologies, zero-carbon solutions, and advanced grid systems. The combination of sub-Saharan Africa's limited existing energy infrastructure, abundant renewable resources, and falling technology costs present enormous opportunities to avoid many of the carbon-intensive choices made by rich economies. But it has prompted some international funders to adopt unrealistic expectations.³⁶ Both renewables and decentralized solutions already play a large (and rapidly growing) role in Africa, but assumptions that they can be scaled continent-wide in the short-term, and leapfrog systemic challenges to fully address all of Africa's electricity needs risk consigning African economies to many years more of energy poverty.

The distributed energy solutions available in African markets are not currently capable of powering large-scale economic or industrial activity at competitive cost. The mini-grid and off-grid markets may provide the least-cost, most appropriate access solutions in certain areas, but do not obviate the need for continued and increased investment in larger-scale energy infrastructure. Waiting for energy storage solutions to become broadly cost-competitive in African markets risks prolonging energy poverty and leaving the region behind yet again. Some development partners continue to install off-grid systems without a model for sustainability, in remote communities where residents may not have the skills or resources to repair or replace broken energy equipment imported from abroad.

Recommendations for development partners:

- **Fund innovation across a broad range of solutions.** Addressing energy poverty will require many different solutions, tailored to solve specific challenges in specific contexts. Development funders should ensure that their support drives investment,

³⁶ Onyeji-Nwogu, 2017: Chapter 3 - Harnessing and Integrating Africa's Renewable Energy Resources; Lopes, C, 2019, How African countries can leapfrog the fossil-fuel based growth in developed countries.

innovation, and cost decreases in a range of technologies, and in policy and business model solutions that reduce costs and enable access by lower-income populations.

- **Support the creation of a clean tech industry in Africa.** Prioritize finance, funding, and knowledge sharing and transfer to support the development of clean tech research and manufacturing in Africa. Like other parts of the world, African countries aspire to capture the value chains for clean energy hardware components as part of their broader industrialization strategies. Funders can draw on the recent successes in advancing local content principles in the oil and gas industry in Africa.
- **Fund cleantech innovation that targets developing markets.** Some wealthy countries, including the US, are rightfully scaling up investment in clean energy innovation.³⁷ But international funders can do more to ensure that support for research and development (R&D) includes a focus on technologies and business models specifically relevant to emerging and frontier markets, including in sub-Saharan Africa, and to accelerate deployment and economic viability of advanced technologies there.
- **Support the enabling infrastructure needed for long-term energy transformation.** Development finance tends to focus on renewable generation. But it must also invest in enabling infrastructure, including: robust transmission and distribution grid systems that can absorb far greater shares of variable renewable energy, facilitate regional trade that can unlock clean energy at large scales, and handle more diversified, distributed resources; and new utility models designed for an evolving customer base.³⁸ Investments in infrastructure and technology for the energy systems of the future will only become more important as electricity demand grows and the share of variable renewable energy increases.

6. Equity. Treat the remaining global carbon budget as a ‘development budget.’

Staying within the world’s finite and rapidly diminishing carbon budget will require “society to make deliberate and morally justified choices about its use.”³⁹ Even if total global emissions were reduced very aggressively *today*, the share of the carbon budget left for the world’s poorest people would be very small, demanding that “our socio-economic and climate policies should be designed to ensure its most equitable use.”⁴⁰ Any remaining space in the carbon budget should be prioritized for low-emitting energy-poor countries. This means that advanced and high-emitting economies must *rapidly accelerate* the rate at which they decarbonize their energy systems, including through the decommissioning of existing fossil fuel facilities. Doing so would create at least some room in the remaining carbon budget for

³⁷ US Dept. of Energy, “DOE Announces \$100 Million for Transformative Clean Energy Solutions,” February 11, 2021.

³⁸ United Nations, “[Theme Report on Energy Transition: Towards the Achievement of SDG7 and Net-Zero Emissions](#),” 2021.

³⁹ Sivan Kartha, Eric Kemp-Benedict, Emily Ghosh, Anisha Nazareth and Tim Gore, “[The Carbon Inequality Era: An assessment of the global distribution of consumption emissions among individuals from 1990 to 2015 and beyond](#),” Stockholm Environment Institute and Oxfam, September 2020.

⁴⁰ Sivan Kartha, Eric Kemp-Benedict, Emily Ghosh, Anisha Nazareth and Tim Gore, “[The Carbon Inequality Era: An assessment of the global distribution of consumption emissions among individuals from 1990 to 2015 and beyond](#),” Stockholm Environment Institute and Oxfam, September 2020.

strategic fossil fuel development by countries in sub-Saharan Africa, where it can serve critical needs. For example, decommissioning three coal-fired power plants in Europe would allow 14 countries in sub-Saharan Africa to maintain their least-cost development pathways through 2030 without any net addition to the fossil fuel generation trajectory.⁴¹ The Paris Agreement recognizes this disparity, noting that equity calls for Parties to “reach global peaking of greenhouse gas emissions as soon as possible,” but that “peaking will take longer for developing countr[ies].”⁴²

Recommendations for development partners:

- **Encourage net-zero targets based on realistic poverty and employment timelines.** President Biden has suggested setting a US target of net-zero power sector emissions by 2035, and China has announced a target of 2060. African targets for net-zero should enable energy ambition, greater energy consumption, and provide a longer transition period where needed.
- **Maintain flexibility to finance natural gas where it's needed, with smart transition plans.** In the poorest countries, international development partners should maintain flexibility to support natural gas-fired generation in instances where it displaces dirtier fuels, provides the best technical and financial options for balancing greater intermittent energy penetration, catalyzes prioritized industrial development, enables cleaner cooking, or supports broader low-carbon development plans.⁴³ As incomes rise and emissions increase, that flexibility could be increasingly limited. Where countries do decide to develop gas-fired assets, funders should assist countries to avoid locking into a carbon-heavy energy system over the long-term. Potential solutions could include timelines for decommissioning, policies and regulations that require emission reductions, financial incentives to encourage decarbonization, requirements that any new gas plants be designed and sited to retrofit carbon capture and storage or be amortized over a relatively short period and slated for early retirement, and grid planning that anticipates the future needs of a renewable-majority power system.
- **Double down on market solutions to end gas flaring.** Flaring of associated gas continues in Nigeria, Angola, and other oil-producing countries despite the heavy economic and environmental cost. This wasted resource could instead be directed to help build a viable gas market or to develop small-scale uses near the source.

⁴¹ Tong et al., cited in Martin Kitetu, et al., *Decarbonizing Africa's grid electricity generation: Practical thinking on investing for development*, CDC Investment Works, May 2021.

⁴² United Nations, [Paris Agreement](#), 2015.

⁴³ Many African Nationally Determined Contributions (NDCs) under the Paris Agreement include gas-fired power plants as tools to reduce sector emissions and increase efficiency: Senegal plans to replace 40% of its coal use with gas; Ghana aims to double the energy efficiency of its power plants by phasing out oil for natural gas; and Nigeria plans to phase out coal and liquid fuels for gas.

Conclusion

Broad references to equity are integrated throughout the Paris Agreement, calling on Parties to recognize the specific needs of developing countries and build just international responses around those considerations. Unfortunately, this important principle is at risk of being lost as development partners and international financiers rush to demonstrate their own commitments to climate mitigation. Climate policy must reflect and respond to the needs and ambitions of those most impacted, and integrate a wider variety of perspectives on the meaning of justice and fairness. In the electricity sector, this means that the development community must approach investment with far greater nuance and a renewed commitment to tackling both poverty and climate change. Widespread adoption of an expanded definition of climate justice and the six principles for supporting just and equitable energy transitions in sub-Saharan Africa will provide a pathway to meeting the economic and climate needs and ambitions of billions who are currently left out of the conversation.