Global Energy Alliance for People and Planet

POWERING PEOPLE AND PLANET

2022

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This report is a product of the Global Energy Alliance for People and Planet (GEAPP). The Catalyst Energy Advisors team of Dan Murphy, Evan Colton, Ian Muir, Andy Bilich, Rachel McManus, Justin Sankara, Annette Omune, and Christine Eibs Singer conducted research, developed original analysis, and drafted the core report content. Neil King provided editorial support. Direction and contributions were provided by the GEAPP team, particularly Eric Gay, Sundaa Bridgett-Jones, Kasia Krol, Courtney Bolinson, Marina Lahowin, Shawna Hoffman, Additional contributions were provided by GEAPP anchor, investment, and upstream partners (pg.8). Design undertaken by AHOY Studios, Connie Koch, Denise Sommer, Denis Kuchta, Nadine Werjant, Arne Spremberg, Scott Brower, Nada Abouzeid, Liv Bustorff, Emily Bluedorn, and Patricia Schuh.

The Argument, at a Glance

3.6 billion people
– nearly half of humanity –
lack access to abundant, reliable energy.

Ending energy poverty requires
2,000 TWh per year
of new electricity, or 4x Germany's current consumption.

Doing that with business-as-usual power generation would
burn more than 4x
the proven reserves of Saudi Arabia by 2070.

There is another way. Clean energy and
battery storage prices have fallen by over 90%
in the past decade, making it the cheapest path to electricity in much of the world.

In 2021 renewable
electricity generation rose by 522 TWh,
or roughly ¼ of what is needed to end energy poverty. Most of this generation occurred in developed countries, but a clean energy future is possible for all, if we work together.

This is why the Global Energy Alliance for People and Planet (GEAPP) exists. GEAPP has set goals of extending or
improving power for 1 billion people,
while enabling or improving
150 million
sustainable livelihoods, and avoiding or averting
4 billion
tons of greenhouse gas emissions.

Why We Exist

Three core truths underpin today's global energy outlook:

1. **Far too many people live without access to modern, affordable, reliable, and abundant power.**
2. **Access to electricity is the key to advancement and global development.**
3. **Delivering that power in a clean, low-carbon fashion is critical to confronting the planet's greatest existential threat – climate change.**

Close to half of us on Earth – around 3.6 billion people – lack access to reliable, abundant electricity. This absence deprives communities of the ability to develop – to communicate, study, irrigate crops, refrigerate foods, and run factories. Lack of power blocks their path to prosperity.

Bringing clean energy to these communities is the key to global development. From remote villages to urban centers, clean energy can spark economic growth, innovation, jobs, and self-advancement.

Powering that crucial development for people across Africa, Asia, Latin America and the Caribbean will require about four times Germany's annual energy consumption. If this energy comes from fossil-fuel-fired power plants, the resulting emissions will significantly worsen the climate crisis.

That is an unacceptable – but also avoidable – outcome. Energy poverty is, by some measures, the single most pernicious force hindering development.

And yet it is worsening – with another 25 million people in Africa now living without energy access, compared with pre-pandemic.[1] In all, three quarters of a billion people – more than live in all of Europe – lack any access to electricity, while another 2.8 billion must get by with sporadic, dirty, often costly electricity. Fuel for back-up diesel generators alone now costs at least $40 billion a year. Lives are diminished and severely restricted by the current reality.

The world is struggling to take the bold steps needed to halt the climate crisis, despite record-breaking heat waves, devastating storms, and soaring concerns about energy security. Recent estimates indicate that the planet is likely to warm by up to 3 degrees centigrade – a possibly catastrophic outcome.

Many developing countries understandably see economic growth and stability as more urgent concerns for their young populations. They look to wealthy nations, who grew rich on the consumption of oil, gas, and coal, as the ones who must lead and finance the energy transition, particularly in the near-term. These concerns carry real weight and should shape but not limit our actions going forward.

Fortunately, we now have the means to tackle these realities and power future development while also combating climate change. Clean energy technologies are becoming cheaper, more effective, and easier to deploy. Today we can produce more energy while cutting emissions.

What's needed is a radical behavior change whereby wealthy nations play – and pay – their part in collaborating with developing countries to simultaneously eradicate energy poverty, decarbonize their energy systems, and ensure economic progress. This energy transition is an *opportunity* for pro-development governments to lower their costs and increase their energy security. This is both a climate change imperative and the best strategy for economic development.

A concerted global effort is needed to shift our current course, starting with finance. Developed countries must be held to their 2016 Paris pledge to contribute $100 billion per year in climate finance. At the same time, private capital markets hold enormous potential to drive change at scale. Catalyzing this capital requires the systematic removal of obstacles that prevent it from flowing to investable and much-needed projects.

The Global Energy Alliance for People and Planet (GEAPP, or the Alliance) was formed precisely to confront and overcome these obstacles. It aims to bring power (in all senses of the word) to communities that lack it, in a way that also helps the planet. The Alliance is determined to show a way forward that can confront climate change while addressing the deep inequities of energy poverty.

Together, let's change energy for good.

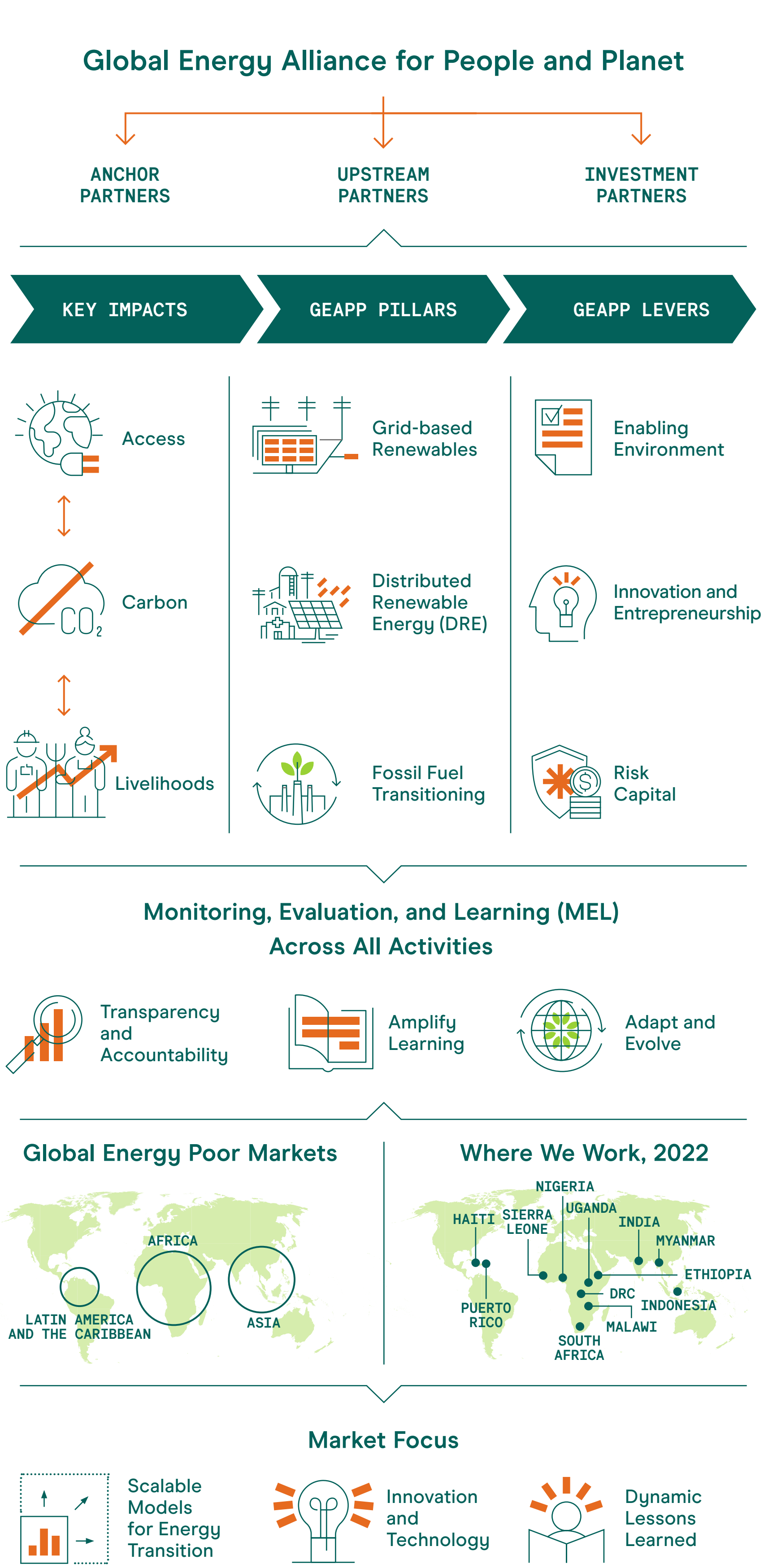
1 Source: IEA, "Global energy crisis shows urgency of accelerating investment in cheaper and cleaner energy in Africa"; available at: https://www.iea.org/news/global-energy-crisis-shows-urgency-of-accelerating-investment-in-cheaper-and-cleaner-energy-in-africa

THE ALLIANCE

The Global Energy Alliance for People and Planet (GEAPP) was launched at COP26 in November 2021 to address the challenge of combating energy poverty while ensuring a just energy transition. The Alliance recognizes that to create major change, a new approach is needed. Multiple players – governments, investors, innovators, power companies, philanthropies, and more – must come together to ensure access to electricity for all people, via low-carbon technologies, and with the economic wellbeing of communities taken into account. We must act quickly, before catastrophic climate change becomes irreversible.

Photo Credit:
Smart Power Myanmar

Figure 1: GEAPP at a Glance



GEAPP's mission is to help catalyze a just energy transition by mobilizing public and private capital to reach one billion people with reliable, abundant, clean power across multiple continents. This work aims to avert four billion tons of carbon emissions – or about a tenth of what human activity now emits annually – and support more than 150 million sustainable livelihoods over the next decade. Through our focus on developing countries' enabling environments, innovation and entrepreneurship, and the deployment of risk capital, the Alliance will serve as a collaborative platform to accelerate investment solutions.

Powering People and Planet will serve as GEAPP's annual impact report. This inaugural edition frames the global challenge, establishes GEAPP's approach to catalyzing positive change, and lays out GEAPP's approach to measuring impact. While this report shares stories of concrete actions already underway, future reports will reflect ongoing progress toward a more sustainable world for all.

Why Now

GEAPP is founded on the principle that we can combat the dire threat of climate change while expanding opportunity for half the world's population. Two things are now true: Growing carbon emissions threaten a climate catastrophe, while a lack of access to reliable electricity limits and diminishes the lives of billions of people. These same low-income communities are also the *most vulnerable* to and *least equipped to deal with* climate change.

We cannot expect governments in energy-poor countries to forgo economic development as part of a global campaign to confront climate change. Instead, we must help these countries develop their economies with technologies that avoid the dirty energy sources that accelerate climate change.

That is the Alliance's mission: to play a catalytic role in combating climate change by bringing clean energy to countries in need of reliable power. *Energy access* and a *clean energy transition* are two sides of the same coin – success hinges upon both being accomplished simultaneously.

The world's current approach to tackling this twin challenge is falling short. While many global organizations and institutions are engaged on these issues, energy poverty remains widespread and uptake of clean energy technologies has been too slow.

This battle against climate change and energy poverty cannot be won by individual countries, institutions, or programs. Collaboration, shared vision, and a reframing of old either/or choices are needed to disrupt the status quo. Rather than choosing between them, the world needs both climate change mitigation and economic development. The world needs action.

Who We Are

The Alliance is a collaboration of philanthropies, governments, development banks, finance institutions, and other organizations with the expertise and resources needed to create transformational progress in energy access, economic opportunity, and decarbonization.

Anchor Partners

The Rockefeller Foundation

IKEA Foundation

BEZOS EARTH FUND

Investment Partners

ADB Asian Development Bank

African Development Bank Group / Groupe de la Banque Africaine de Développement

British International Investment

DFC

European Investment Bank

IFC International Finance Corporation World Bank Group — Creating Markets, Creating Opportunities

The World Bank IBRD • IDA | World Bank Group

IDB Inter-American Development Bank

IDB Invest

USAID From the American People

Upstream Partners

Energy Transition Council

IRENA International Renewable Energy Agency

isa International Solar Alliance

Power Africa A U.S. Government-Led Partnership

RMI Energy Transformed

Sustainable Energy for All

GEAPP's *Anchor Partners* – the Bezos Earth Fund, the IKEA Foundation, and the Rockefeller Foundation – provide the Alliance with risk-tolerant grant capital, set the strategic vision, and use their deep experience in philanthropy to help ensure consistent progress toward our goals.

A group of global multilateral investment banks, development finance institutions, and regional development banks serve as GEAPP's *Investment Partners*. They include: African Development Bank Group, Asian Development Bank, British International Investment, European Investment Bank, Inter-American Development Bank, IDB Invest, International Finance Corporation, U.S. Agency for International Development, U.S. International Development Finance Corporation, and the World Bank Group.

These financial institutions bring a wealth of development experience and global relationships, catalyzing progress and dramatically amplifying the amount of capital the Alliance can bring to bear.

The third group of GEAPP partners are expert agencies that bring technical capabilities and local expertise to the Alliance. These organizations include the International Renewable Energy Agency, Energy Transition Council, International Solar Alliance, Power Africa, RMI, and Sustainable Energy for All. These groups all share an ability to support governments and other stakeholders to develop and deliver programs.

With this combination of vision, funding, and technical and local expertise, the Alliance is well-positioned to drive transformational change in energy access, economic opportunity, and de-carbonization around the world.

What We Do

The Global Energy Alliance for People and Planet is a collective action platform, built to tackle the specific and systemic challenges of universal energy access, emissions reductions, and sustainable livelihoods for all. GEAPP uses a radically collaborative approach, modeled on the successful and innovative global vaccine alliance, Gavi. The Alliance works in partnership with national governments across Africa, Asia, Latin America and the Caribbean, and other global partners, to bring together and align stakeholders that would otherwise remain fragmented. Operationally, the Alliance engages at the country level with partner governments, and at the project level with investment and upstream partners.

Photo Credit:
Power Africa/TIA Productions

GEAPP Program Highlights

The following stories highlight a selection of GEAPP's first year of activities around the world. Expected impacts are included, when available. See "Focus on Impact" for methodological details.

NIGERIA
Lowering Costs for Renewable Energy Developers (DART)

INDIA
India Accelerates Solar for Rural Small Businesses

NIGERIA
Ending Energy Poverty via DREs in Nigeria

SOUTH AFRICA
Facilitating a Just Energy Transition in South Africa

MYANMAR
Solar to Power up Myanmar's Agricultural Economy

ETHIOPIA
Mini-Grids to Power Agricultural Communities in Ethiopia

PUERTO RICO
Renewable Energy to Ensure Power at Critical Facilities in Puerto Rico

NIGERIA
Energizing Agriculture in Nigeria Through Productive Uses of Energy

Expanding Economic Opportunities for Women

SIERRA LEONE
Hydropower is Advancing Sierra Leone's Power Sector

HAITI
Rural Development Through Productive Uses of Energy in Haiti

MALAWI
Battery Storage for Grid Stability in Malawi

INDONESIA
Accelerating the Just Energy Transition in Indonesia

Partner Project Highlights

The following stories highlight a selection of relevant activities undertaken by Alliance partners:

INTERNATIONAL FINANCE CORPORATION
Scaling Mini-Grid Program to Increase Clean Electricity Access in the DRC

AFRICAN DEVELOPMENT BANK
Partnering with the African Development Bank to Power the Sahel Via Solar

U.S. INTERNATIONAL DEVELOPMENT FINANCE CORPORATION
DFC's Golomoti Solar Project in Malawi

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
Power Africa is Enhancing Access to Healthcare Across the Continent

INTER-AMERICAN DEVELOPMENT BANK
Investing in Low-Carbon Universal Electricity Access in Latin America and the Caribbean


Abubaka Umar, owner of a commercial charging booth in Shimankar Village, Nigeria.

Lowering Costs for Renewable Energy Developers

Demand Aggregation for Renewable Technology (DART) is a key program that aggregates demand, standardizes equipment, and enables bulk procurement of renewable energy components. This project, currently piloting in Nigeria, aims to drive down the cost of developing mini-grids. In the coming years, DART is expected to expand to Ethiopia, Madagascar, and beyond, bringing utility-scale pricing to mini-grid projects across Africa.

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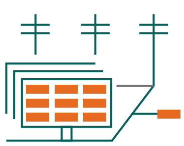
Photo Credit:
Smart Power Myanmar

Developing Clean Energy Solutions

GEAPP supports three primary project types, which are the pillars of GEAPP's transformational work. By combining projects across these pillars into country-specific portfolios, the Alliance develops flexible and systemic solutions that are tailored to the specific needs of each country.

GEAPP PILLARS



Grid-tied Renewable Energy: These clean energy projects build off and expand the capacity of existing electricity grids, helping to make their electricity more abundant, reliable, affordable, and of course, clean.

Distributed Renewable Energy: These clean energy technologies are deployed in isolation from existing electricity grids, often in remote, rural areas. Because they are typically not interconnected with a larger grid, they have different needs for energy storage, demand stimulation, operation and maintenance, and community education.

Fossil Fuel Transition Projects: These projects seek to replace existing high-emissions electricity sources with new clean-energy solutions. These projects should also advance the economic wellbeing of local communities.

Mohammad Naushad (in front) and Mohammad Musi (behind) operate the lathe, powered by solar energy, in Bihar, India.

Photo Credit:
The Rockefeller Foundation

Boosting India's Rural Enterprises with Rooftop Solar

While nominally electrified, rural India suffers from unreliable and poor quality electricity that is holding back business. The Smart Power India project is addressing this problem by deploying small scale solar faster than ever before. With reliable and high-quality power and no fuel costs, rural businesses are able to invest, expand, and drive equitable economic growth.

LIVELIHOODS
405,000 new and improved jobs
2.7 million livelihoods impacted

CARBON
2030:
11 million tCO_2e
End of life:
94.6 million tCO_2e

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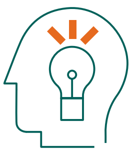
Driving Scale

In selecting projects to include within a country program, the Alliance seeks replicability and scalability. For each project, GEAPP systematically applies three levers to maximize the impact of invested resources.

GEAPP LEVERS

Enabling Environment: Building government capacity and improving market conditions for private sector solutions. This is accomplished by developing and coordinating beneficial policies at the country level, and by providing the financial support needed to access the right expertise and develop needed capacities.



Innovation & Entrepreneurship: Catalyzing new business models, applied technology, and innovative finance to unlock a new generation of clean-energy solutions. The Alliance encourages innovative and entrepreneurial approaches and provides pivotal support to replicate and scale solutions quickly.

Risk Capital: Deploying at-risk capital to encourage private sector participation in creating just energy transitions for energy-poor countries. This includes de-risking project development to increase the pipeline of investable projects and taking “proof of concept” risk on innovative solutions. These interventions can then be scaled via Alliance partners to accelerate and expand impact.

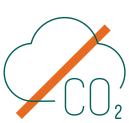
Delivering Impact

Measurable impact is at the center of all Alliance activities. The Alliance has three key, quantified measures of success that guide project selection, design and deployment. These impact goals are also GEAPP’s public anchor for accountability.

KEY IMPACTS

Energy Access: The Alliance has set a goal of extending sustainable, abundant energy to 1 billion underserved people.

Sustainable Livelihoods: Energy access and reduced emissions alone are not enough to ensure all people can experience lives of dignity. Thus, the Alliance has set a goal of enabling or improving 150 million sustainable livelihoods that generate inclusive economic growth.



Carbon Emissions Reduction: The Alliance supports this goal with a target of avoiding or averting the release of over 4 billion tons of greenhouse gases (CO_2 equivalent).

Additional details on how GEAPP measures impact can be found in the **Focus on Impact** section below.

Amos, at his barber shop that is powered by solar energy in Shimankar Village, Nigeria.

Turbocharging Access in Nigeria with Distributed Renewables

Nigeria combines a large and dynamic economy with the world's biggest unelectrified population. The Alliance is supporting a diverse set of innovative projects in Nigeria, designed to bring clean electricity, economic development, and sustainable livelihoods to underserved communities.

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GEAPP in Action

To drive the rapid progress we need, at global scale, levers alone are not enough. GEAPP is explicitly an *alliance* that is greater than the sum of its parts. Through strong partnerships and a portfolio approach, GEAPP is creating the foundation for transformational change.

Country Partnerships

The Alliance acknowledges the injustice at the heart of the world's climate and energy challenge: that developed countries have accounted for the majority of historical emissions, while today's energy-poor countries are expected to forgo emissions-intensive energy for the sake of the planet. The Alliance is committed to developing trusting, responsive, and collaborative relationships with partner governments and will remain engaged for the long-term.

The Alliance positions itself on the side of developing nation governments, designing customized programs that help them meet the urgent needs of their citizens. GEAPP engages at every level of government, from heads of state to technical staff in the relevant government agencies, facilitating smooth communications, and channeling the political will needed to get big things done. The Alliance is a neutral party, with no commercial interests and no agenda except positive impact on energy access, clean energy transition, and sustainable livelihoods.

The Alliance achieves unusual agility and responsiveness through a decentralized approach, emphasizing a strong presence on the ground in partner countries. Rather than attempting to direct operations from some distant headquarters, GEAPP's design, setup, and execution of projects are all led by teams at the local level with the greatest contextual knowledge. This enables nimble action and fast feedback loops, all informed by hard data. Each country program reflects this *on the ground expertise* and consists of a portfolio of projects designed to catalyze systemic change and impact.

Since launching in 2021, the Alliance has partnered with governments and other stakeholders in South Africa, Nigeria, Democratic Republic of Congo, Ethiopia, Haiti, India, Indonesia, Sierra Leone, Malawi, Myanmar, Puerto Rico, and Uganda to drive progress against energy poverty and toward decarbonized and inclusive economies. The Alliance will form new partnerships in additional countries over the coming years, with *Powering People and Planet* serving as a means to share lessons learned and to demonstrate our impact.

South Africa's Komati coal-fired power plant is being decommissioned and will be repowered and repurposed with clean energy.

Photo Credit: Eskom

South Africa's Just Energy Transition

South Africa has substantially more electricity generation capacity and higher per capita consumption than most Alliance partner countries. However, South Africa's power sector depends heavily on coal for both electricity generation and employment opportunities. The Alliance is supporting the government's ambitious Just Energy Transition program that aims to decarbonize the power sector while also building the foundation for sustainable livelihoods in local communities.

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Photo Credit:
Power Africa/Justice Kalebe

Projects

The Alliance's project investments translate our impact model into real action on the ground. These projects may be designed to test new models, develop proofs-of-concept, strengthen project pipelines, or create the conditions for achieving scale. The core principle underpinning each Alliance-supported project is that it must have the potential to be catalytic.

The Alliance collaborates to deploy technical assistance, grants, and investment capital where they are needed most. These resources and activities are aligned to drive the three levers (enabling environment, innovation/entrepreneurship, and risk capital) that magnify total impact.

The ultimate goal is to mobilize the appropriate resources to help supported sectors reach a tipping point. When these tipping points are reached, supported projects are seen as mature enough to merit funding via financial markets and countries are able to source the capital needed to meet their transformative goals. The Alliance's investment approach drives projects through a process that starts with grant-dependent pilot projects and eventually reaches maturity and privately-funded scale.

Examples of supported projects and their expected impacts are referenced throughout this report, and can be found in their totality here.

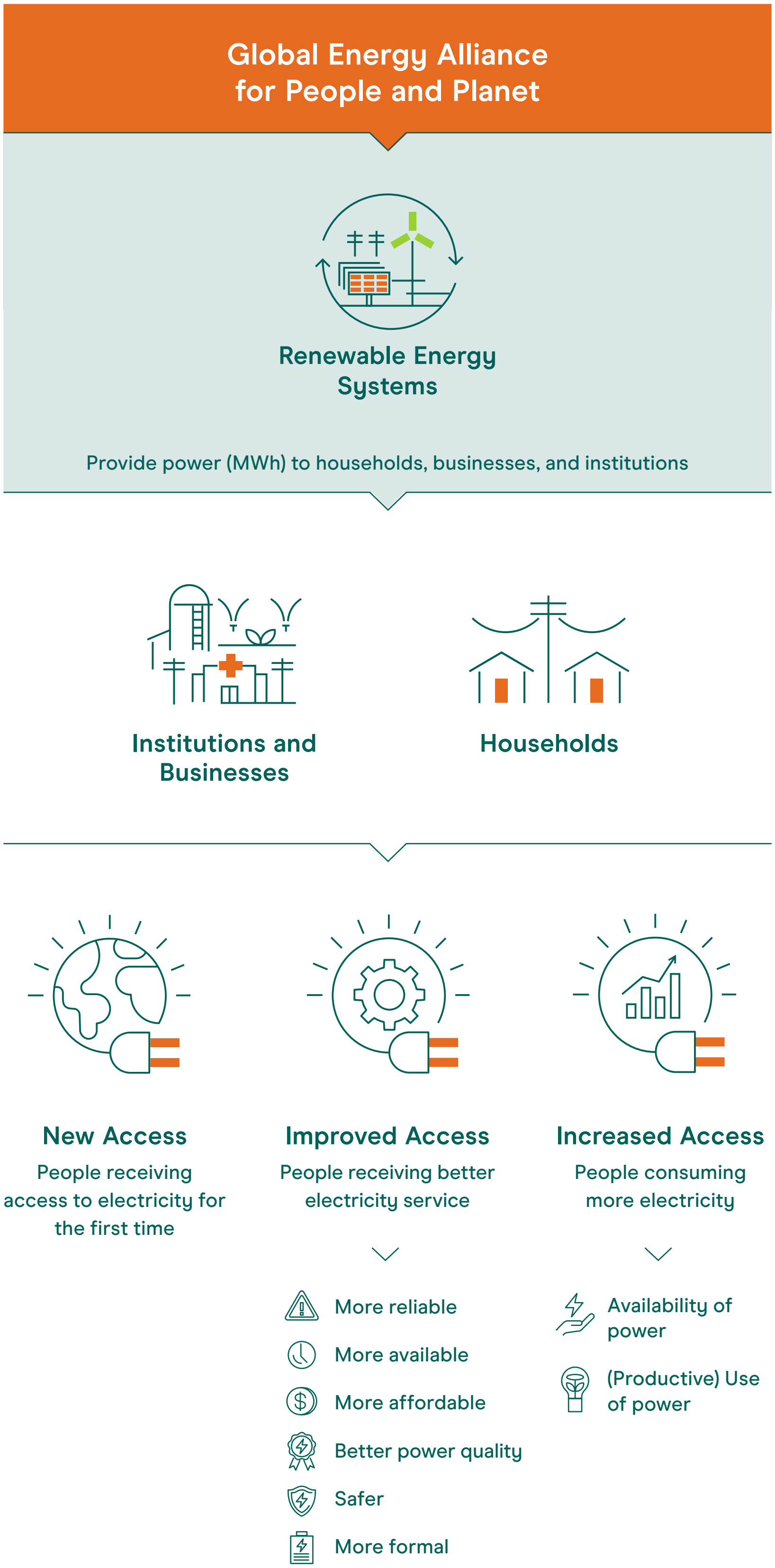
Focus on Impact

Everything that GEAPP does is in service of advancing its three impact goals: i) access to sustainable, abundant energy, ii) enabling or improving livelihoods, and iii) reducing greenhouse gas emissions. To this end, we prioritize robust and independent impact measurement and work with leading M&E experts, data scientists, and others to track and understand our impact.

We are currently deploying a standardized approach to assess the *potential* impact of GEAPP's projects on access, livelihoods, and emissions. These methods build on existing best practices while adapting them to account for new technologies and new ways of thinking about our work. In addition to driving accountability, this approach will also help identify projects with the greatest potential to advance our goals.

Photo Credit:
Power Africa/TIA Productions

Figure 2: New, Improved, and Increased Access to Electricity



Impacts on Energy Access

We use data analytics to project the potential impact of our investments on first-time access, improved power quality, and affordability. First-time access to electricity at the household level is relatively straightforward to measure. However, the power provided by that connection must also be reliable, abundant, and affordable to truly tackle energy poverty.

GEAPP's approach to measuring its energy-access impact draws on established frameworks, particularly the World Bank's multi-tier framework (MTF), which goes beyond the traditional binary of whether one has a grid connection. As outlined in *Figure 2*, GEAPP will use the MTF in three ways. *New access* will capture first time connections; *improved access* will track material changes in power reliability, affordability, availability, quality, or safety; and *increased access* will capture increased consumption at household, enterprise, or facility level. Alongside more traditional data collection methods, the Alliance will also deploy sensible proxies and technologies (e.g. smart meters or data loggers) to demonstrate lean ways to use the MTF while still maintaining rigor.

Scaling Mini-Grid Program to Increase Clean Electricity Access in the DRC

In collaboration with GEAPP, the International Finance Corporation (IFC) is unlocking private sector investment for metro-grids and mini-grids in the DRC. This program aims to deploy 180 MW of solar PV capacity and electrify over 1.5 million homes, businesses, schools, and clinics in the cities of Mbuji-Mayi and Kananga.

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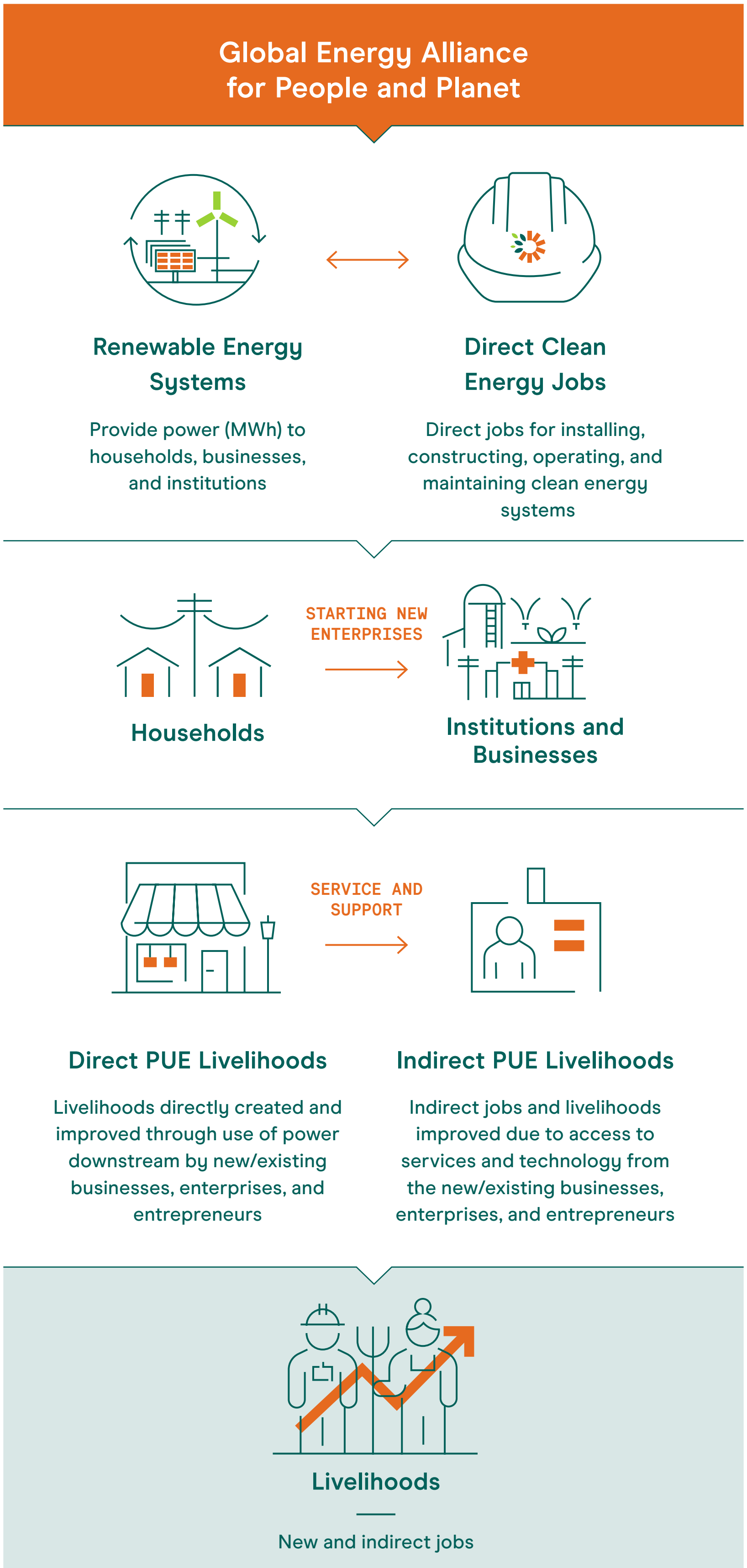
Figure 3: Measuring Improved Livelihoods



Livelihoods

GEAPP believes that energy is an enabler of livelihoods and that a just energy transition must improve economic opportunity. GEAPP's holistic view of livelihoods considers three distinct impacted populations (outlined in *Figure 3*).

Supply Side Jobs: These are the individuals working to design, build, and operate new energy access activities, whose incomes are directly tied to projects supported by GEAPP. These are the easiest impacts to track.

Direct Energy Users: These are the individuals whose livelihoods are improved using electricity from Alliance projects. Some people will have better livelihoods when they become more productive, due to their use of electric machinery. Others will gain new jobs when electricity makes local businesses more profitable and able to expand. These impacts may prove challenging to track and will require a mix of approaches to capture data from project developers and/or sample-based data collection.

Indirect Livelihood Impacts: These are the individuals whose livelihoods are improved as a result of access to a product or service that was made available because of a GEAPP clean energy project. For example, when a new mini-grid powers an agricultural processing facility, local farmers can process their crops and sell them for higher and more predictable prices. These impacts are the most difficult to track and require more intensive data collection and novel approaches to standardizing metrics.

Photo Credit:
Smart Power Myanmar

Bringing Solar to Myanmar's Agribusinesses

Without electric machinery, Myanmar's great productive potential in rice, rubber, aquaculture, and processing is going unfulfilled. The Alliance is facilitating the deployment of commercial solar through financial de-risking and technical support. As Myanmar's agribusinesses gain access to reliable power and machinery, productivity will rise and residents' livelihoods will improve.

LIVELIHOODS
13,000+ improved jobs
160,000 impacted livelihoods

CARBON
2030:
326,000 tCO_2e
End of life:
2.5 million tCO_2e

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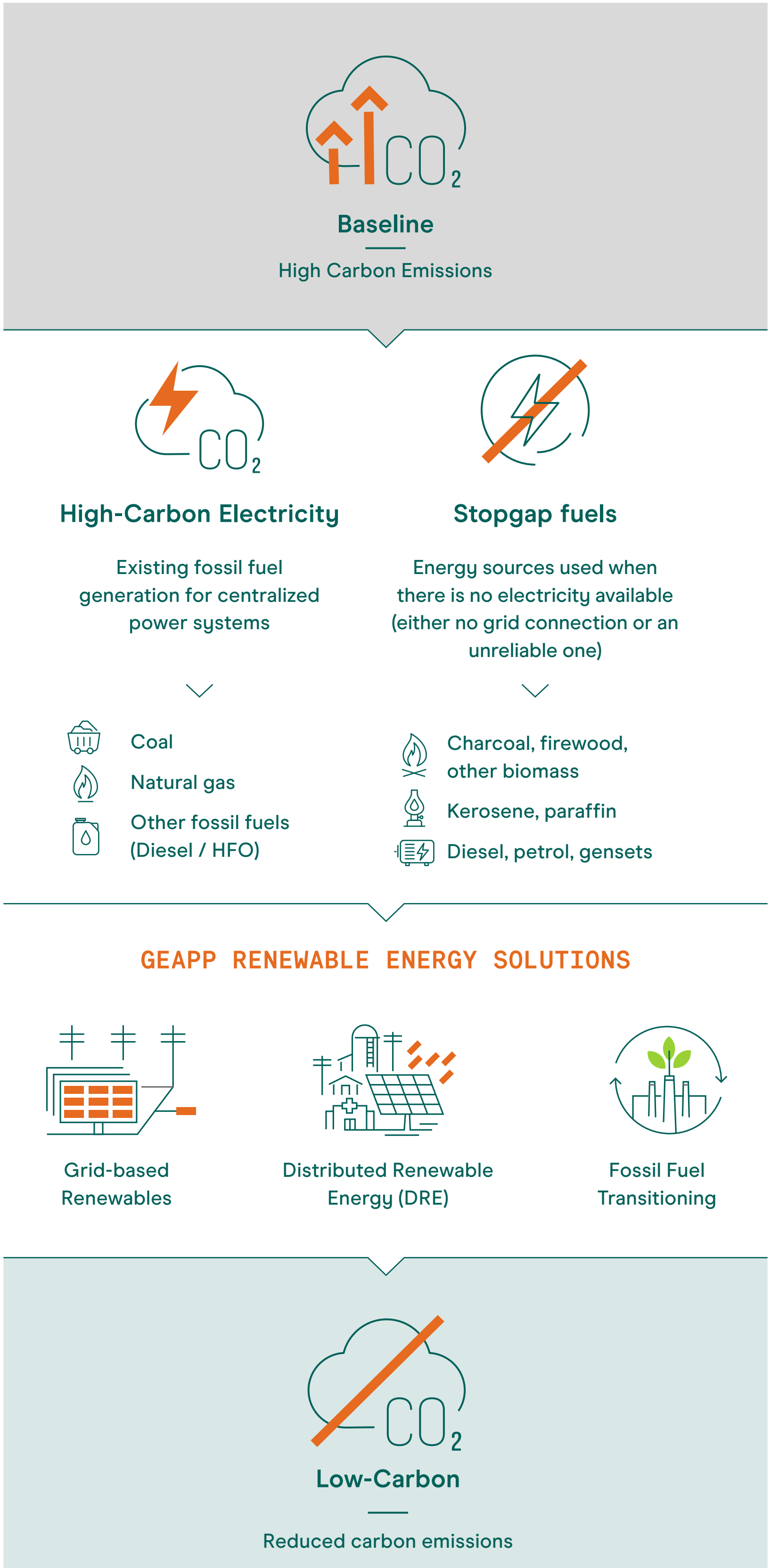
Figure 4: Measuring Emissions Reductions



Reducing CO_2 Emissions

As depicted in *Figure 4*, measuring emissions reductions depends on comparing baseline emissions (coming from high-carbon energy sources or stopgap solutions) against the emissions associated with new behaviors, such as consuming electricity from distributed renewables.

The Alliance is applying and (where necessary) adapting existing methods to estimate both baseline and post-intervention emissions. Our approach leverages several existing methods developed for carbon markets, such as the Clean Development Mechanism (CDM), the Verified Carbon Standard (Verra), and the Gold Standard, along with sector- or intervention-specific tools. Given the rapid evolution of the renewable energy sector, some elements of these established methods may be outdated. In cases where technological or business model changes affect impact projections, GEAPP will adjust its methods to produce estimates that are robust and accurate reflections of reality.

Projecting Forward

Impact *projections* are an essential element of GEAPP's project investment process and are a fundamental part of our measurement, evaluation, and learning practice. As GEAPP's work matures, we will test and refine the assumptions in these methodologies, enabling us to estimate impacts more accurately over time.

A selection of early Alliance project case studies is available here. Several of these cases include expected impact numbers derived from tools and methods developed to date.

THE GLOBAL CHALLENGE

Ending energy poverty and assuring a just energy transition are one and the same challenge. We can bring a reliable supply of electricity to those who now lack it while also reducing carbon emissions. Any other path would undermine efforts to avoid a climate catastrophe.

Ending Energy Poverty

Historically, energy poverty has been viewed through the simple lense of whether one was connected to the electricity grid. While it is critical that we continue to expand connections, energy poverty is a more nuanced challenge. The quality and quantity of electricity consumed are also critical variables that determine whether people can truly participate in the benefits of electrification.

Photo Credit:
The Rockefeller Foundation

Figure 5: 1.16 Billion People Unelectrified in 2010

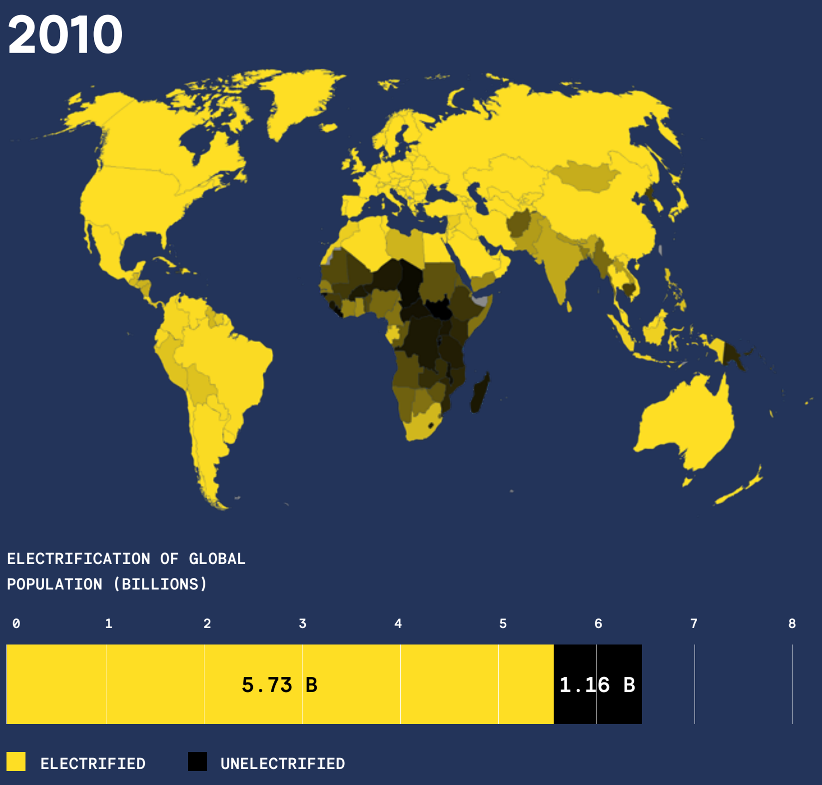


Figure 6: Almost Half a Billion People Gained Access to Electricity Between 2010 and 2020

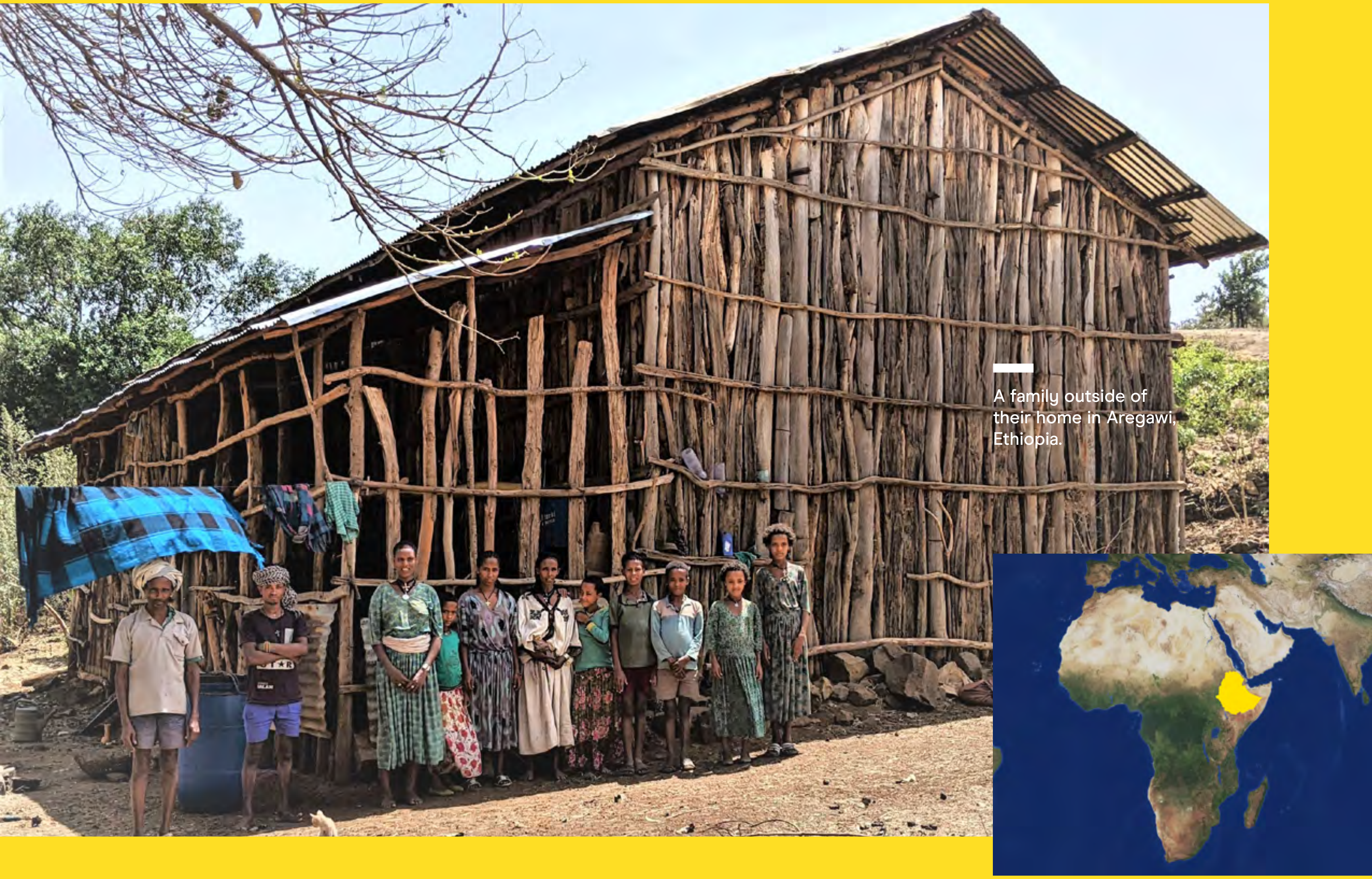
No Access

The earth is now home to 8 billion people. While half of us take electricity for granted, three quarters of a billion people still don't have basic access to the electricity needed to power their lives and livelihoods.[2] Another 2.8 billion suffer from unreliable access to power and/or get by on less than the established minimum energy usage needed to emerge from energy poverty.

As a result, their daily lives and future prospects differ dramatically from those of typical developed-world residents. They not only lack the countless conveniences that electricity provides, from light to refrigeration, but also the ability to transform their lives through commerce and contact with the wider world. Energy poverty blocks their most basic avenues of opportunity.

The world has made real progress extending the benefits of electricity to more people, despite some setbacks during the Covid-19 pandemic. The number of people deprived of all access to electricity has fallen from 1.2 billion in 2010 (*Figure 5*) to 0.75 billion today (*Figure 6*), representing the electrification of communities with almost half a billion people in just over a decade.[3] While this is undeniably positive, progress tends to become more difficult over time. Research shows that, on our current trajectory, there will still be about 670 million people without access to electricity in 2030.[4]

2 Source: Tracking SDG7 – SDG 7.1.1 Electrification Dataset; available at: https://trackingsdg7.esmap.org/downloads
3 Source: Tracking SDG7 – SDG 7.1.1 Electrification Dataset; available at: https://trackingsdg7.esmap.org/downloads
4 Source: IEA, SDG7: Data and Projections; available at: https://www.iea.org/reports/sdg7-data-and-projections



A family outside of their home in Aregawi, Ethiopia.

Powering Farmer Productivity in Ethiopia

The Distributed Renewable Energy – Agriculture Modalities (DREAM) initiative is building the first solar mini-grid-powered large-scale irrigation systems in Africa, providing farmers with reliable, affordable, and sustainable irrigation. The abundant power from these systems will also enable agricultural processing that will improve farmers' livelihoods and create new opportunities for employment in rural communities.

ACCESS
290,000+ with new or improved access

LIVELIHOODS
60,000+ new and improved livelihoods

CARBON
2030:
200,000 tCO_2e
End of life:
500,000 tCO_2e

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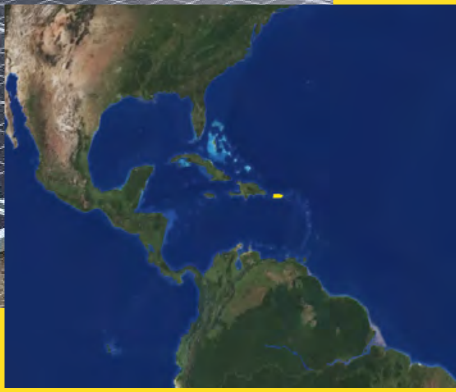
Solar panels being installed at a service station in Puerto Rico.

Photo Credit: RMI



Renewable Energy is Ensuring Power at Critical Facilities in Puerto Rico

Hurricanes in 2017 and 2022 resulted in millions of Puerto Ricans losing power for weeks or months. Climate change continues to increase the risk of further harm to lives and livelihoods. The Alliance is helping to fund and deploy solar power systems that provide resilient power sources for critical facilities in times of crisis.

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Of the roughly 0.75 billion people without access to electricity today, the vast majority live in Sub-Saharan Africa and South Asia.[5] Without electricity, their daily lives are hard and depend disproportionately on manual labor or subsistence farming. Women, in particular, are stuck in a persistent drudgery trap. Without electric lighting at home, even basic activities can be a struggle after sunset. Adults cannot do productive work and children cannot study, impairing their hopes of rising out of the poverty into which they were born.

Whenever people lack access to modern energy, they inevitably turn to stopgap solutions. Today's most popular lighting alternatives, such as kerosene or flashlights powered by disposable batteries, are dirty, dangerous, and expensive. Fumes from open wick kerosene lanterns can damage lungs, eyes, and general health. They also pose a real risk of fire in homes. Disposable dry cell batteries are polluting and surprisingly costly for poor families.

Energy poverty also harms communities in a variety of other ways. Lack of electricity in medical facilities reduces the availability and quality of care across the board, from common ailments to critical health services like prenatal care. This is unfair to people who are born energy-poor through no fault of their own.

5 Source: Tracking SDG7 – SDG 7.1.1 Electrification Dataset; available at: https://trackingsdg7.esmap.org/downloads

6 Source: SEforAll "Lasting Impact: Sustainable Off-Grid Solar Delivery Models to Power Health and Education" (2019), available at: https://www.seforall.org/publications/lasting-impact-sustainable-off-grid-solar-delivery-models

Over

60%

of healthcare facilities in Sub-Saharan Africa lack reliable access to electricity[6]

Muluneh, a deputy manager of a solar site in rural Ethiopia.

Photo Credit: African Development Bank

Partnering with the African Development Bank to Power the Sahel via Solar

The Sahel region of North Africa has some of the densest solar resources in the world. As part of its New Deal on Energy in Africa and Great Green Wall Initiative, The African Development Bank is supporting the development of the world's largest solar zone. This Desert to Power Initiative will harness the Sahel's solar energy to provide clean electricity for 250 million people.

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In unelectrified areas, most people live off subsistence farming. This work is incredibly strenuous and pays very little, or nothing at all. Often, smallholder plots of farmland yield just enough for a family to get by. These farmers face persistent risk of severe setbacks. Without irrigation, lack of rain can easily kill crops or reduce yields, exposing them to lower incomes and food insecurity. Without electricity, machinery, medical care, and other elements of modernity, they have little chance at a better life.

A simple solar-powered water pump demonstrates how life-changing access to electricity can be. If used for irrigation, it is likely to increase crop yields, boost income, and thereby transform farmers' and their families' lives. At home, a powered pump can save hours spent on collecting water for cooking, washing, or drinking, further freeing family members, especially women, to invest their time in income-generating activities, education, or leisure.

Electricity is also an essential factor for accessing the information resources of the global community. Telecommunications have spread faster than electricity access. But without electricity for recharges, phones quickly become useless and modern telecommunications slip back out of reach. In the developed world, the cost to charge a phone is a fraction of a penny. But for tens of millions of people who have mobile phones but no electricity at home, that same charge-up (available from a business) can cost over 100 times as much.[8]

Most of the world's energy-poor live in hot tropical zones and without electric fans, there is often no relief from heat, even at night. This can lead to dangerous heat stress with significant risk of damage to health or even mortality. Electric fans also help keep mosquitoes at bay, and without them, communities face greater risk of mosquito-borne diseases like malaria and dengue.

For all people, whether urban dwelling or rural, in a factory or on a farm, access to electricity unlocks opportunities, reduces costs, and dramatically improves quality of life.

7 Source: 60_decibels: Uses and Impacts of Solar Water Pumps; available at: https://storage.googleapis.com/e4a-website-assets/Use-and-Impacts-of-SWPs-July-2021-v2.pdf

8 Source: Authors' calculations assuming average-sized smartphone battery (4,000 mAh, 3.8V; 15 Wh) and average electricity rates in the US and Europe ($0.15-$0.30 per kWh) vs. typical charging service cost in developing contexts.

In their 2021 report on the impact of solar water pumps in 6 SSA countries, 60 Decibels found that customers spent an **average of 8.8 hours per week collecting water** before the solar water pumps.[7]

Community members queue for drinking water at Murche, Ethiopia. A new solar mini-grid power will enable large-scale cluster irrigation farming throughout the year.

Figure 7: Reliable vs Unreliable Power Grids

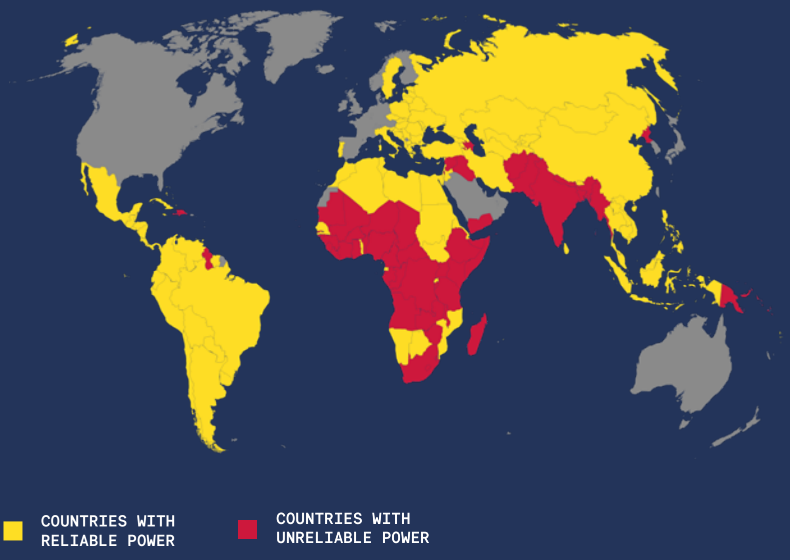
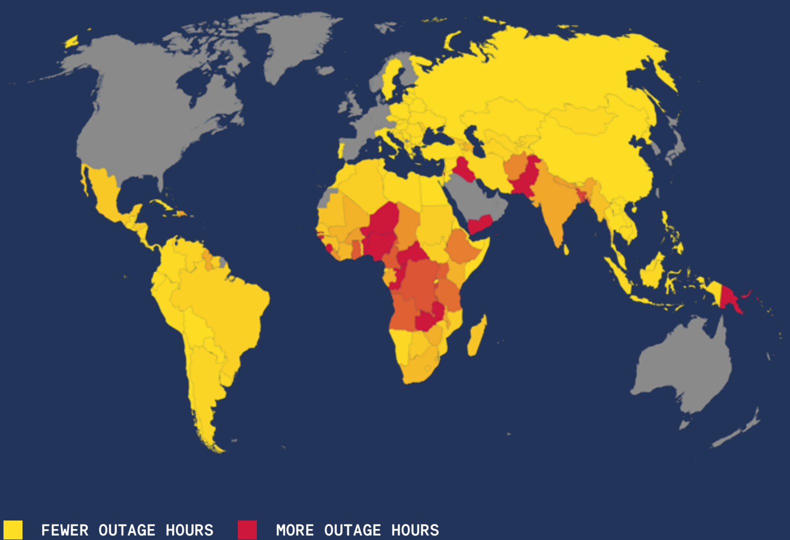


Figure 8: Electricity Outages

AVERAGE NUMBER OF OUTAGE HOURS PER MONTH



Unreliable Access

Most people in developed countries take the reliability of their grid-based electricity connections for granted. But it isn't so simple in developing countries, where the electricity grid often suffers from frequent and long-lasting outages. For the sake of analysis, a power system is considered unreliable if it experiences more than 12 hours of outage per month. Within these unreliable electricity markets, visible in *Figure 7*, **unreliable** electricity imposes its own high costs on at least 1.6 billion people.

People and businesses with unreliable electricity face a difficult choice between accepting the costs of outages and investing in backup systems. Research shows that there are at least 25 million backup generator systems being used in energy-poor countries, with fuel costs of at least $40 billion per year (and likely far higher at today's prices).[9] Together, installed capacity of these backup generators is a whopping 350 GW, equivalent to 700 medium-sized coal plants.[10] This enormous investment in expensive and polluting electric generation capacity is as wasteful as it is understandable. There are far better ways – for the planet and for these communities – to supply people and economies with the power they need.

9 Source: IFC, The Dirty Footprint of the Broken Grid, 2019; Available at: https://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/financial+institutions/resources/dirty-footprint-of-broken-grid

10 Source: IFC, The Dirty Footprint of the Broken Grid, 2019; Available at: https://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/financial+institutions/resources/dirty-footprint-of-broken-grid

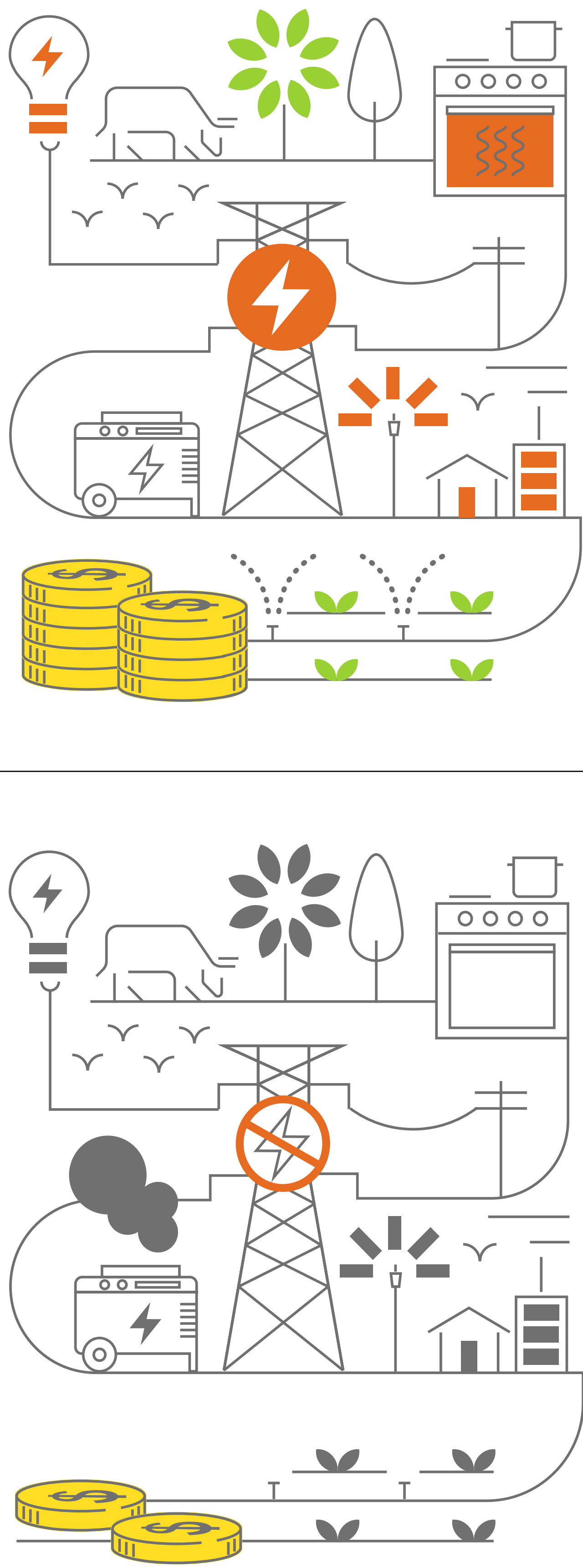
The direct costs of power outages are well above $100 billion per year[11] and easy to imagine, but there are also high indirect costs. When electricity is intermittent, people tend to fall back on the same expensive, dirty, dangerous, and inconvenient alternatives they used before they had any electricity at all (battery-powered flashlights, kerosene, candles, etc.). For example, urban families in developing countries like Nigeria may have access to some electricity to power basic appliances like TVs, lights, and fans. But without dependable electricity, they will likely hesitate to invest in electric appliances such as refrigerators, electric irons, and washing machines. These tools can significantly lower the daily burden of running a household, but their value is quickly undermined if they are frequently unavailable due to power outages. The reliability of power delivery has a large impact on families' decisions about what kinds of tools and appliances are worth buying.

Failure to invest in electric equipment has consequences. Without electric appliances, family members, and especially women, are forced to spend their days on (unpaid) labor-intensive menial tasks. If they had access to time- and labor-saving electric tools, they could instead engage in wage-earning labor, entrepreneurship, education, or other activities that would help them realize a better future.

11 Source: World Bank, Underutilized Potential: The Business Costs of Unreliable Infrastructure in Developing Countries, 2019; Available at: https://elibrary.worldbank.org/doi/10.1596/1813-9450-8899

Pinki and Chandravati study by candlelight in Uttar Pradesh, India. Photo Credit: The Rockefeller Foundation

Figure 9: Clean, Reliable Power Drives Economic Activity



Unreliable power is costly to businesses too. Without dependable power, businesses will often invest less in machinery. This lowers output, contributing to slower economic growth, suppressed wages, and fewer job opportunities in their communities. Those businesses that can afford to purchase and operate fossil-fuel backup power systems, such as diesel generators, must still divert precious capital away from more productive uses. Either way, livelihoods suffer.

Whether at home or at work, unreliable grid connections force people to adopt expensive stopgap solutions. These alternatives divert valuable resources away from more productive investments and exacerbate the vicious cycle of energy poverty.

In energy-poor countries businesses depend heavily on reliable electricity access.

But

68.5%

of firms experienced outages that averaged 67.5 hours per month.

Business in developing countires lose

6.7%

of sales evey year due to electricity outages.[12]

12 Source: World Bank Enterprise Surveys; available at: https://www.enterprisesurveys.org/en/enterprisesurveys

The United States met the MEM threshold in the first half of the 20th century and currently exceeds it by

1,200%

Insufficient Access

Access to electricity is just the start. To understand energy poverty, we need to look beyond the simple binary question of whether a person has access to electricity. Energy *consumption* underpins all elements of modern life, at home and at work. Without a minimum level of energy consumption (which powers productive activities), people still cannot unlock the real benefits of electrification.

The Modern Energy Minimum (MEM) framework offers a new way to think about the importance of energy consumption. It sets an electricity consumption threshold of 1,000 kWh per capita per year, split between residential consumption (300 kWh) and non-residential consumption (700 kWh) as the minimum energy usage needed to emerge from energy poverty. This adds valuable nuance to the understanding of energy poverty. Beyond those with no access, at least another 2.6 billion people in the world have some access to electricity but are below the MEM level of consumption.[13]

Research shows that the correlation between energy consumption and income is extraordinarily strong. There is no such thing as a high-income, energy-poor country.[14] Access to energy is the precursor to prosperity. The strength of this relationship is visible in *Figure 10*.

13 Source: Authors' calculations, leveraging Tracking SDG7 – SDG 7.1.1 Electrification Dataset, IEA per capita electricity consumption data

14 Source: Energy for Growth Hub, The Modern Energy Minimum, available at: https://www.energyforgrowth.org/wp-content/uploads/2019/01/FULL-Modern-Energy-Minimum-final-Jan2021.pdf

Energizing Agribusiness in Nigeria

The *Energizing Agriculture Program* is piloting innovative ways to add value to agricultural economies near mini-grid sites across Nigeria. Through investments in electric machinery for processing crops, transportation, and other productive uses of energy, this program aims to dramatically improve rural economies and improve the economics of mini-grids. Success will see wide replication across Nigeria and beyond.

LIVELIHOODS
150,000+ new and improved jobs
4 million livelihoods impacted

CARBON
2030:
1.4 million tCO_2e
End of life:
7.4 million tCO_2e

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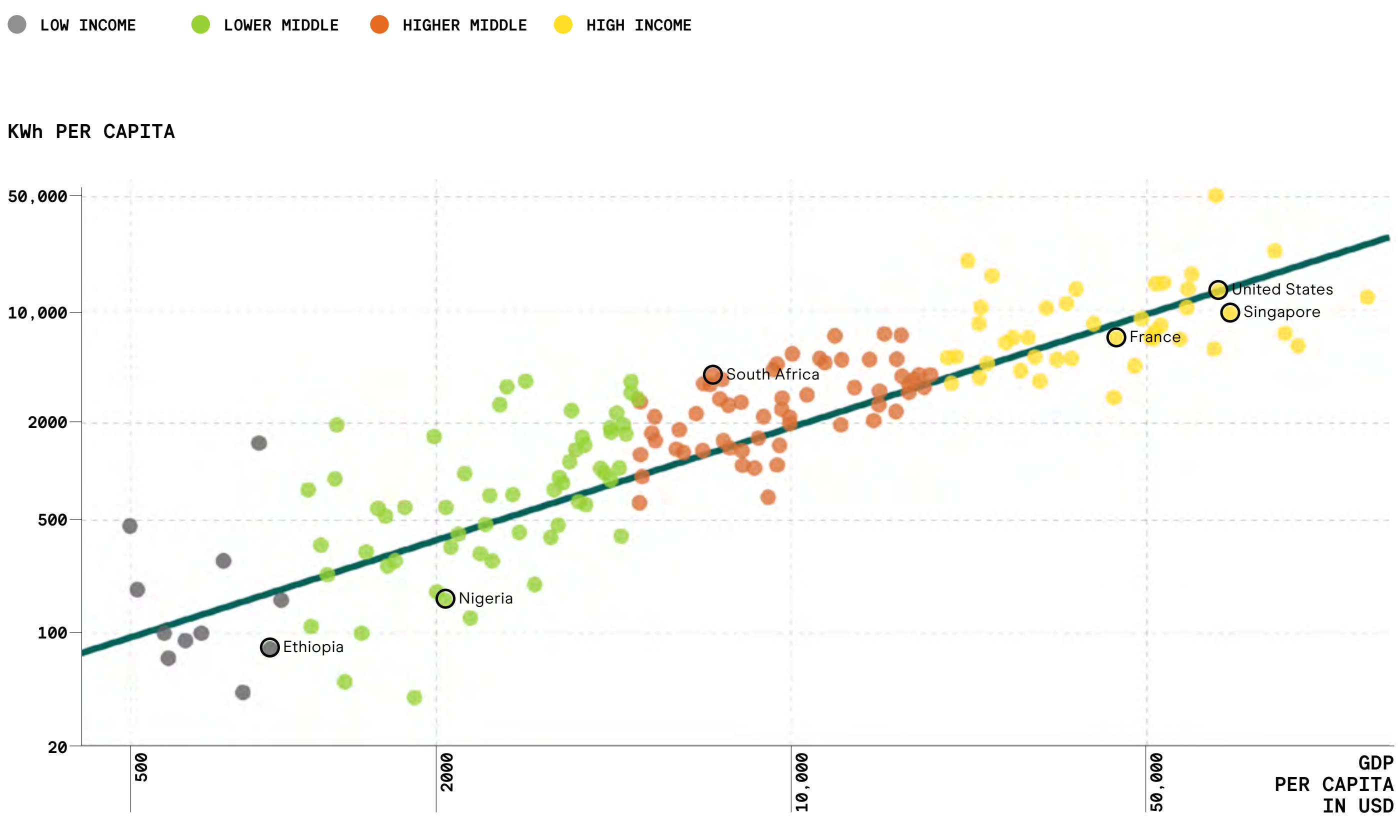
Every high-income country consumes at least 3,000 kWh per capita annually.[15] Meanwhile, in many energy-poor countries, consumption levels are a tiny fraction of the MEM threshold. For example, per capita consumption in Haiti is under 50 kWh per year. In relatively energy-rich Nigeria, the figure is still just 133 kWh, whereas at 988 kWh, India is on the brink of crossing the 1,000 kWh threshold.[16] For low- and middle-income countries, per capita energy consumption is as strongly predictive of development (measured by the Human Development Index) as is per capita GDP.[17]

The MEM concept shows how reliable access to electricity is not sufficient to break out of energy poverty. Without electric powered tools and appliances to make productive use of energy, reliable access means relatively little. To address the need for economic growth and decent work for all, people need to **consume** more energy. To consume more energy, families and businesses need income, electric devices, and affordable electricity costs that compare favorably with the alternatives (including foregoing the work done by electricity). Increased access to any of these inputs helps produce the higher consumption associated with development.

15 Source: Authors' calculations, leveraging US EIA data for US historicals, IEA per capita electricity consumption data, and World Bank country designations.
16 Source: IEA Data Browser, available at: https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser
17 Source: Authors' calculations based on regression analysis of per capita GDP and electricity consumption data vs. HDI score

Figure 10: The Strong Relationship Between Electricity Consumption and Income



At work, the introduction of modern electrical machinery often displaces manual labor that is slow and inefficient, or it enables new activities that were previously impossible. For example, carpentry work can be done with hand power, but is vastly more efficient with electric saws, drills, and sanders. For farmers, the introduction of cold storage and other value-adding activities such as milling, grinding, pressing, cleaning, sorting, and packaging enable crops to be stored longer and sold for higher prices. Electric tools and machinery thus lead directly to higher productivity, returns on investment, and profit.

At home, electric appliances such as refrigerators, washing machines, and irons can save hours of daily drudgery and free up time for income-generating activities or education. When more family members earn wages or start new businesses, the whole family's economic fortunes can improve quickly. Women tend to reinvest up to 90 percent of earnings into their families, creating a "multiplier effect" with large demonstrated impacts on child education and nutrition. And when family members can devote more time to studies, their futures grow brighter.

As communities approach the MEM level of electricity consumption, they experience a dramatic improvement in the quality of their daily lives. Businesses become more productive and better able to invest. Jobs shift away from unskilled manual labor and toward higher-skilled and higher-paid work. At home, families above the MEM threshold experience less drudgery, more comforts, and higher incomes. The use of power is transformational.

Top:
Abdul Hadi, a tailor whose shop in Shimankar Village in Nigeria is powered by a solar mini-grid.

Bottom:

Photo Credit:
Smart Power Myanmar

Rose Marie Gades, from Roche a Bateau in Haiti, has seen her income from her small business quadruple since she recieved a freezer from Fonkoze that is powered by a solar mini-grid. She is now able to send her seven children to school.

Women & Energy

By bringing together the rapidly expanding clean energy sector and women's economic empowerment programs, GEAPP has an opportunity to co-locate climate, energy and gender investments to maximize the impact for women, while also building a gender-balanced renewable energy sector from the outset. Read more about these efforts here.

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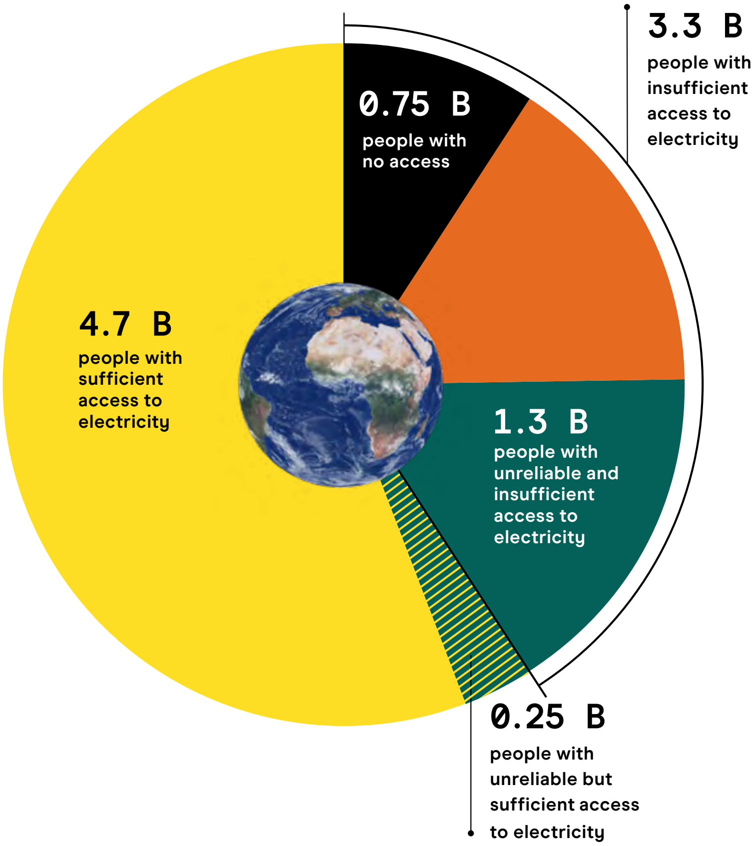
Figure 11: Different Types of Energy Poverty

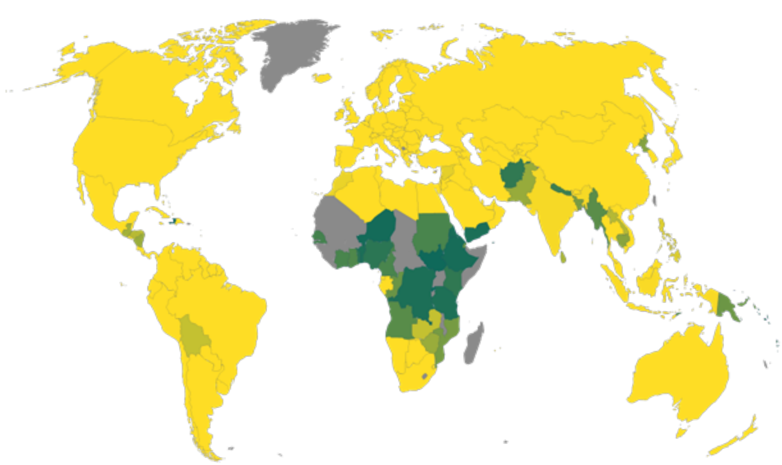


Despite the well-established links between electricity, economic development, and personal wellbeing, over 3 billion people still reside below the MEM consumption level, classifying them as energy-poor. While people with **no access** to electricity are a distinct population, there is significant overlap between those who have unreliable access to electricity and those who have access but consume so little power that they are still considered energy-poor. The relationships between these populations are illustrated in *Figure 11*.

Every person in the world should have the opportunity to consume the MEM threshold amount of power. Achieving that will require a tremendous amount of new electricity generation, particularly in the world's poorest countries, as shown in *Figure 12*.

Figure 12: Per Capita Electricity Consumption

AVERAGE ANNUAL PER CAPITA ELECTRICITY CONSUMPTION BY COUNTRY



FEWER OUTAGE HOURS   MORE OUTAGE HOURS

For all the world's energy-poor to reach the MEM level of consumption by 2030, at least another 2,000 TWh per year of power needs to be produced.[18] This is more than two times Japan's current annual consumption.[19]

18 Source: Authors' calculations, leveraging IEA per capita electricity consumption data, IEA residential share of electricity consumption data, and UN DESA World Population Prospects 2022 medium variant projections (all publicly available).

19 Source: IEA Data Browser, available at: https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser

ENSURING A JUST ENERGY TRANSITION

Buhari, a battery repairman, poses with a battery at his shop in Shimankar Village, Nigeria.

Clean Energy Choices

The 2,000 TWh per year of additional electricity needed to lift some 3 billion people out of energy poverty is an enormous amount of power – two times Japan's annual consumption, four times Germany's. Without this new electricity use, a significant portion of humanity will face stagnant productivity, labor conditions, and wages at work. It is imperative that we end energy poverty and ensure all people can live dignified and productive lives. The critical choice is *how* to produce the needed energy.

Figure 13: New Electricity Generation Needed to End Energy Poverty

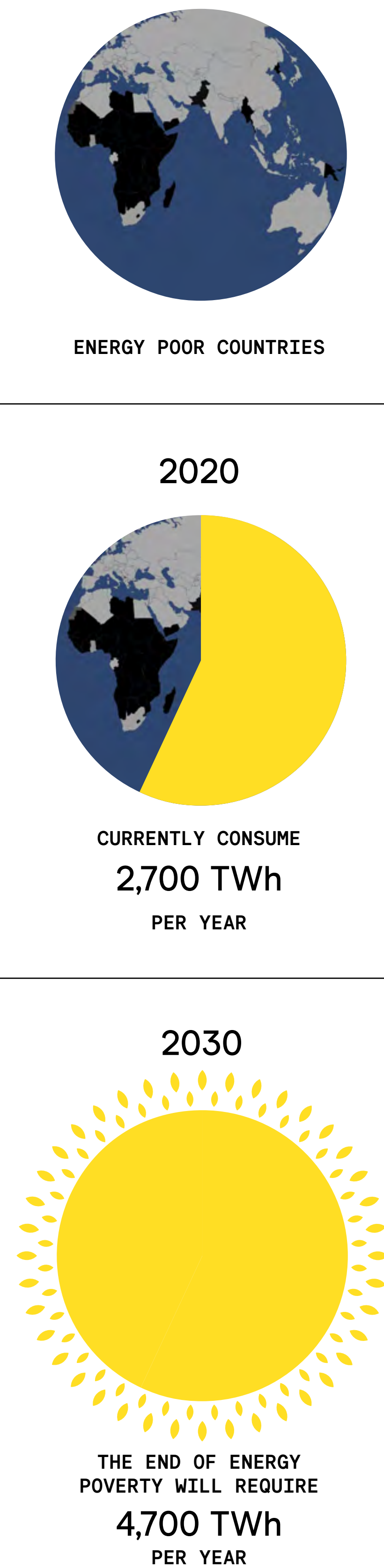
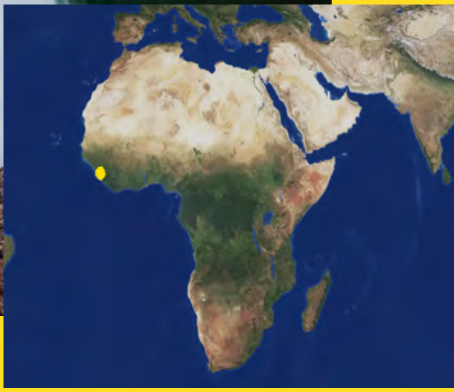


Photo Credit:
The Rockefeller Foundation

The Betmai Hydroelectric Project will bring electrification to many rural areas of Sierra Leone.



Hydropower to Lower Fossil-fuel Dependency in Sierra Leone

Sierra Leone has chronic electricity shortages and is highly dependent on foreign-owned, fossil-fuel-powered, and expensive offshore power barges. The Alliance is supporting the development of the Betmai hydroelectric power station, which will dramatically and cleanly increase Sierra Leone's power generation capacity. This project includes regulatory capacity building and is expected to catalyze further investment in power transmission and distribution systems.

ACCESS
175,000+ with new or improved access

LIVELIHOODS
300,000+ new and improved livelihoods

CARBON
2030:
675,000 tCO_2e
End of life:
3.5 million tCO_2e

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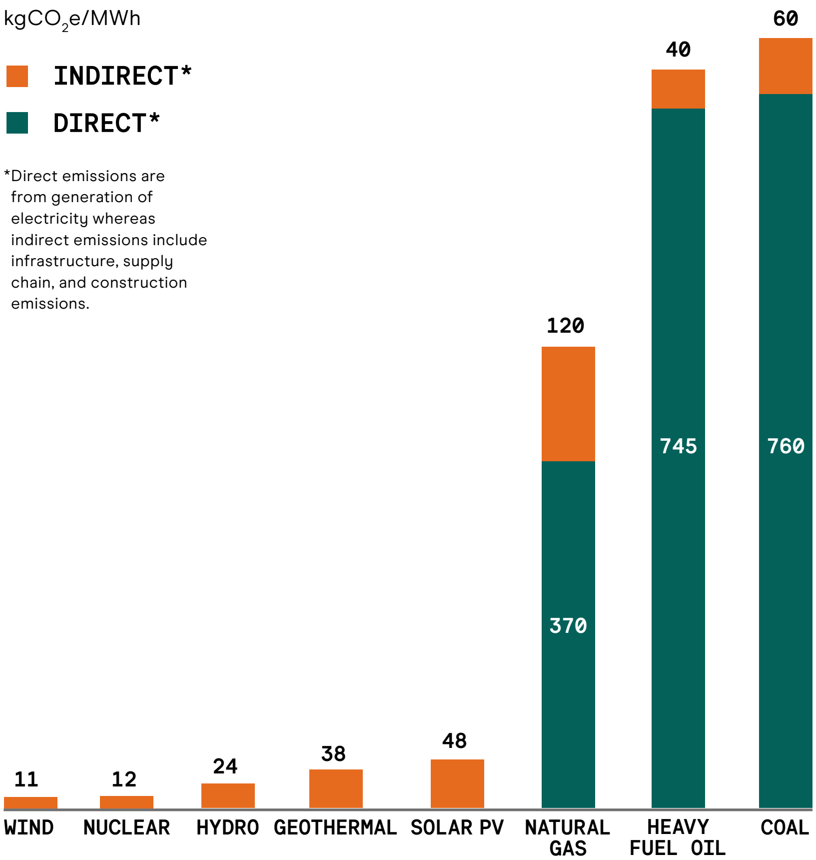
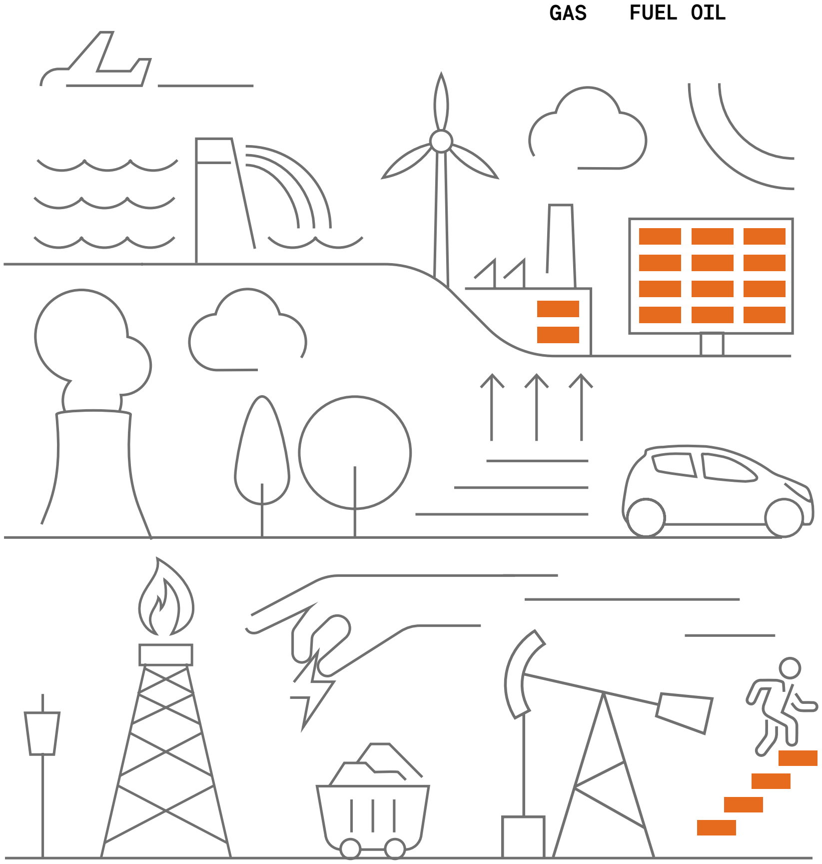
Figure 14: CO_2 Emissions from Fossil-fuel Generation Dwarfs Renewbales





If this new electricity generation were to come from coal, then by 2040 the world would be adding an additional 2.5 gigatons of carbon to the atmosphere each year. This much CO_2 is about 40 percent more than the combined annual emissions of the world's aviation and shipping sectors.[20] While coal is the most emissions-intensive technology for generating electricity, power generated from heavy fuel oil or diesel generators is not far behind. As illustrated in *Figure 14*, electricity from natural gas produces significantly fewer emissions than coal- or oil- based power, but when both direct and indirect emissions are counted, natural gas' emissions are still ten times greater than those from solar PV.[21]

The quest to end energy poverty thus hinges on two primary considerations. First, what type of power generation technologies will be used to generate the needed electricity, and second, how that energy is distributed. The choice between emissions-intensive generation technologies such as coal and gas on the one hand and renewables on the other is stark. The choice of technologies and business models to *deliver* power is less well understood but can be generally distilled to a question of **centralized** distribution systems vs **distributed** systems.

20 Authors' calculations based on IEA, Tracking Transport 2021, available at: https://www.iea.org/reports/transport

21 Solar PV indirect emissions occur during the manufacturing, distribution, installation, and disposal of systems components

Solar mini-grid in Coteaux, Haiti.

Rural Development through Productive Uses of Energy in Haiti

Haiti has the lowest electrification rate in the western hemisphere and difficult terrain that makes it particularly well-suited for mini-grids. Since low demand for electricity in rural areas is holding back development, the Alliance is supporting an innovative project to stimulate demand through microentrepreneurship, with a particular focus on cultivating productive use of energy among women entrepreneurs.

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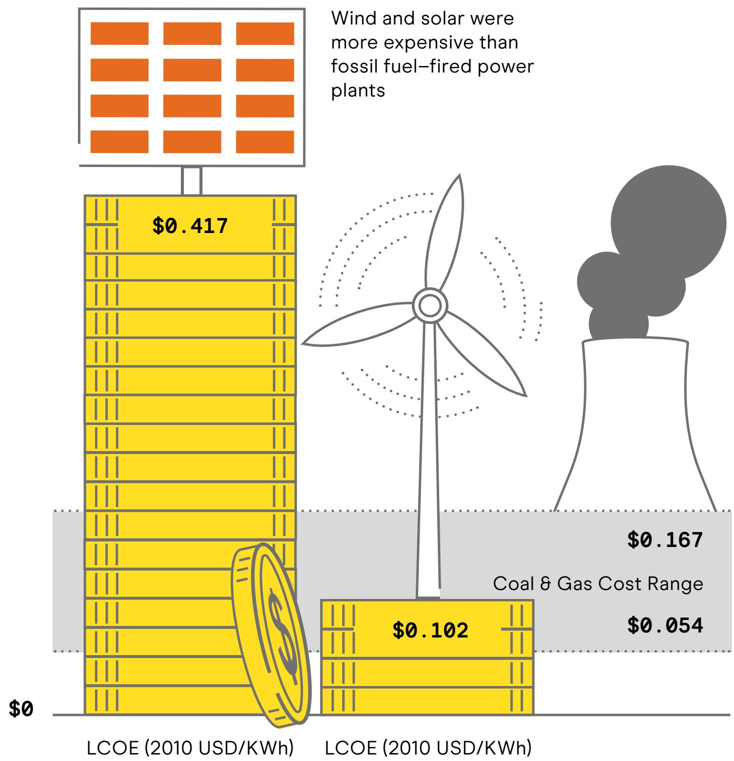
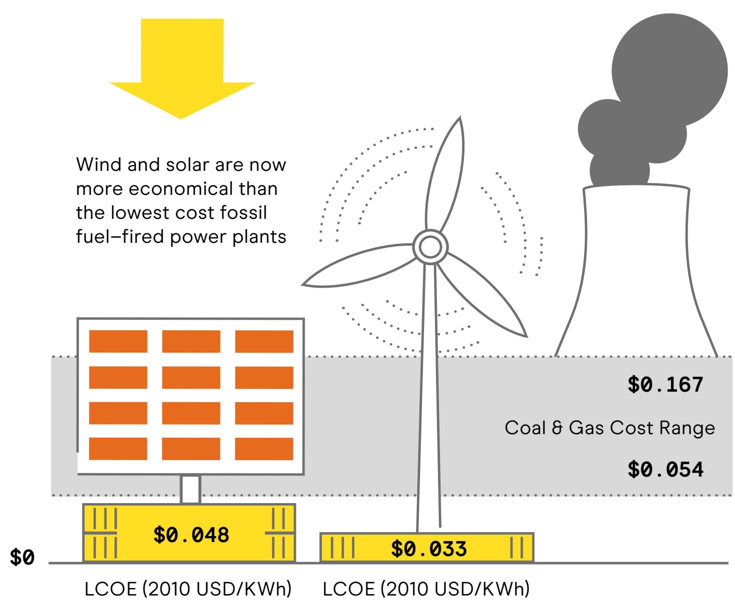
Figure 15: Levelized Cost of Electricity[22]

2010



2021



Conventional wisdom tells us that emissions-intensive power generation sources have the advantage of being less expensive than renewables. Particularly for the utility-scale projects that feed a centralized electric grid, the data shows that this is no longer the case. Per *Figure 15*, IRENA's 2021 research demonstrates that utility-scale renewable energy from wind and solar is now more economical than the lowest-cost fossil fuel-fired power plants.[22] Many also claim renewables are impractical because of intermittency. While it is true that the wind does not blow and the sun does not shine all the time, there are solutions to this challenge.

22 Source: IRENA, Power Generation Costs, 2021; Available at: https://www.irena.org/publications/2022/Jul/Renewable-Power-Generation-Costs-in-2021pdf?la=en&hash=C0C810E72185BB4132AC5EA07FA

A solar site being built in a community in rural Malawi.

Pioneering Utility Scale Battery Storage in Malawi

Malawi has an unusually clean power sector, but the variability of power from hydroelectric dams and solar systems is contributing to electric grid instability. An Alliance-supported Battery Electric Storage System will stabilize Malawi's grid, enable the rapid expansion of solar power, and prove that battery systems can solve clean energy's variability challenge.

ACCESS
2.4 million with new or improved access

LIVELIHOODS
450,000 new and improved livelihoods

CARBON
2030:
8,000 tCO_2e
End of life:
20,000 tCO_2e

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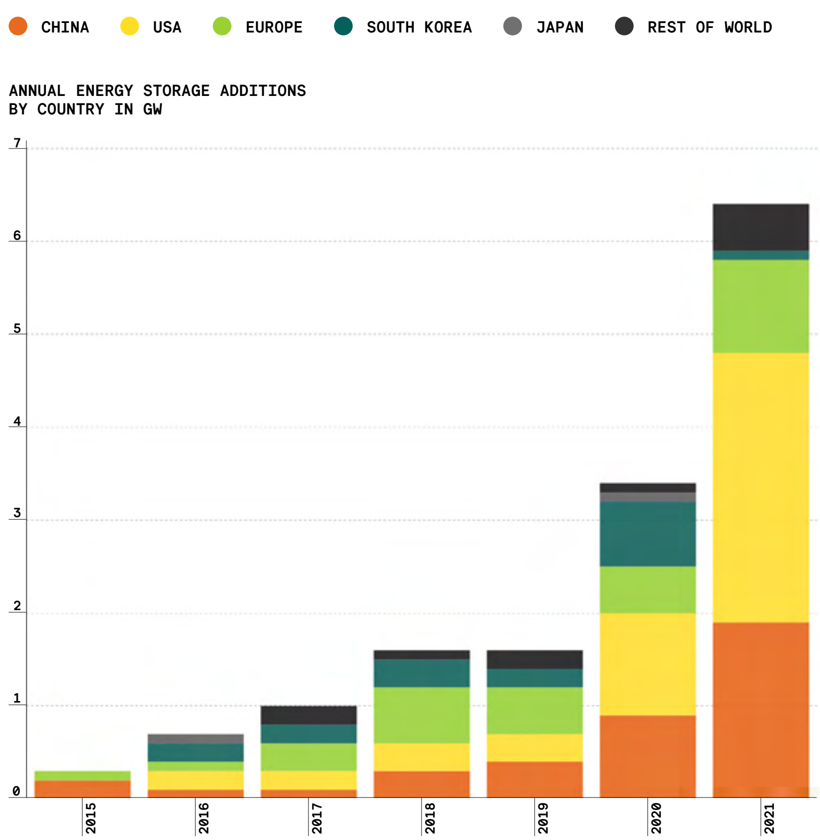
The same battery technologies that power your phone or laptop computer can be used to store renewable energy for later. The data shows a dramatic, rapid, and accelerating expansion of installed battery storage in recent years. Prices for lithium-ion batteries fell by 89 percent between 2010 and 2021,[23] contributing to a 500 – 600 percent increase in the annual deployment of battery storage.[24] Costs of both renewables and energy storage have now fallen to the point that building new renewable energy systems with battery storage can be cheaper than operating existing oil-fired power stations, which are particularly commonplace in Sub-Saharan Africa and the Asia Pacific region.[25] While this global progress is vital for the decarbonization of the world's energy systems, it is also notable that, for now, energy-poor nations have not benefited nearly as much as developed ones.

Renewable energy offers the developing world a better alternative to the construction of expensive power grids. In recent years, **distributed renewable energy** (DRE) systems have undergone a revolution in quality and affordability. Compared to traditional, centralized approaches to energy, DRE is faster to build, more reliable, more resilient, and of course, carbon-free. A 50 kW mini-grid can be deployed in as little as two months, instead of the years or decades it takes to build traditional power grid infrastructure. With uptime close to 99 percent, renewable mini-grids are also far more reliable and resilient to disasters than traditional grid-extensions.[26] This reflects a major benefit of these types of more modular, decentralized technologies.

Renewable energy is experiencing an explosion of deployment in the developed world. By the middle of 2022, the United States alone had about 130 GW of installed solar PV capacity,[27] which is more than double the solar PV capacity of all energy-poor countries combined and ten times the amount installed across all of Sub-Saharan Africa.

Even without considering climate change, utility-scale renewables are a cost-effective and compelling investment opportunity. The pace at which they can be deployed is remarkable and underscores the many advantages of renewable energy. Furthermore, the ongoing DRE revolution offers a critical alternative to quickly bring high quality electricity access to remote and energy-poor regions. This avoids the time and investment required for grid expansion activities, while maintaining the flexibility to build an isolated mini-grid that can later interconnect with the main grid.

Figure 16: Growth of Energy Storage



23 Source: Bloomberg New Energy Finance, "Battery Pack Prices Fall to an Average of $132/kWh, But Rising Commodity Prices Start to Bite", available at: https://about.bnef.com/blog/battery-pack-prices-fall-to-an-average-of-132-kwh-but-rising-commodity-prices-start-to-bite/

24 Source: IEA, Annual energy storage additions by country, 2015-2020; available at: https://www.iea.org/data-and-statistics/charts/annual-energy-storage-additions-by-country-2015-2020

25 Source: Author's calculations leveraging NREL's U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks: Q1 2021

26 Source: Rockefeller Foundation, *Electrifying Economies*: available at: https://www.rockefellerfoundation.org/rf-microsites/electrifying-economies/

27 Source: SEIA, "Solar Industry Research Data"; available at: https://www.seia.org/solar-industry-research-data

Photo Credit:
Power Africa/TIA Productions

Power Africa is Enhancing Access to Healthcare Across the Continent

Through its Healthcare Electrification and Telecommunication Alliance, Power Africa aims to enhance health services by providing clean electricity and mobile data systems to approximately 10,000 healthcare facilities across sub-Saharan Africa. This initiative will improve healthcare access for vulnerable populations, facilitate infectious disease monitoring, reduce greenhouse gas emissions, and cut operating costs by eliminating the need to rely on diesel generators.

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Environmental Implications

The needed 2,000 TWh per year[28] of additional electricity (four times Germany's current consumption) is currently less than 10% of the developed world's consumption. Non-energy-poor countries consume 23,000 TWh per year.[29] If developed countries meet their emissions reduction goals in the coming years, then the future of global emissions derived from electricity generation will be determined by what happens in today's energy-poor nations.

28 Source: Ember Data Explorer; available at: https://ember-climate.org/data/data-explorer/

29 Source:CAIT Climate Data Explorer; available at: https://www.climatewatchdata.org/

Accelerating the Just Energy Transition in Indonesia

Indonesia simultaneously has one of the most coal-dependent power sectors in the world and an urgent commitment to cutting emissions while stimulating economic growth. With the help of the Alliance, and partners like the Asian Development Bank, the government of Indonesia is establishing an Energy Transition Mechanism Country Platform and developing a new methodology to monetize avoided emissions from the early decommissioning of coal-fired power plants.

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Figure 17: Fossil Fuels for the Poor

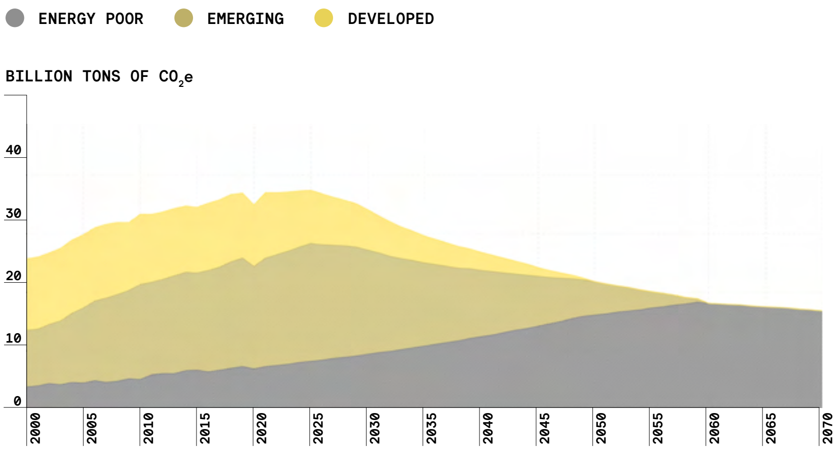

Figure 18: Scenario 2: Clean Energy for All[30]

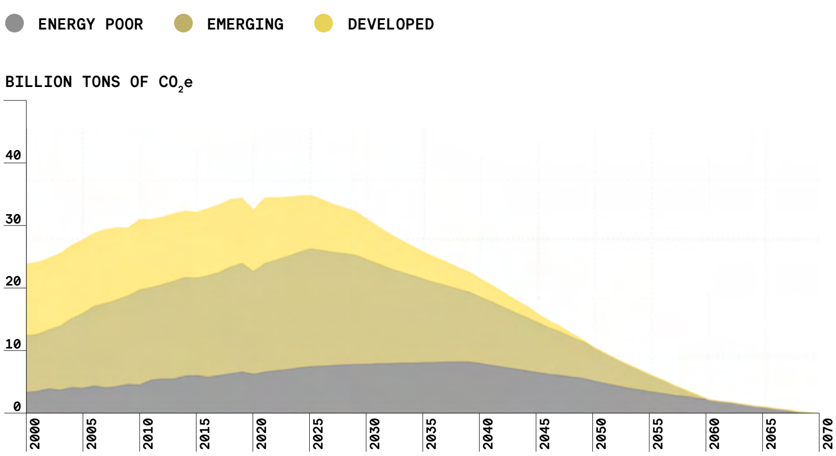

Figure 17, Fossil Fuels for the Poor, illustrates what happens if today's energy-poor countries rely on emissions-intensive technologies to end energy poverty. In this scenario, emissions will continue to grow in line with past patterns of economic development, adding 678 gigatons of CO_2 to the atmosphere by 2070. This is equivalent to more than 1.5x the cumulative emissions of the United States to date.[31]

In contrast, *Figure 18* shows what happens if those countries receive sufficient support to deploy renewable energy. In this scenario, CO_2 emissions from today's energy-poor countries will be 58 percent lower. The difference between these scenarios is equivalent to burning all of Saudi Arabia's proven oil reserves four times over.[32]

The data is clear: if energy-poor countries escape energy poverty using fossil fuels, their emissions will rise to become the majority of global CO_2 output by the early 2040s. This would be a disaster for the planet, negating the emissions reductions progress of the rest of the world and accelerating climate change.

We also cannot leave hundreds of millions or billions of people languishing in energy poverty and denied economic opportunity and growth. The solution requires extraordinary effort and collaboration among governments, development finance institutions, philanthropies, and other international organizations – exactly the roster of partners now committed to GEAPP. Together, we must choose the low-carbon development path for ending energy poverty. The world needs GEAPP.

30 Source: Author modeling leveraging data from CAIT and assuming that OECD countries reach net zero by 2050, emerging economies by 2060, and energy-poor countries by 2070, with emissions growth reversed in the latter by 2040.

31 Source: Author modeling leveraging data from CAIT and assuming that emissions grow at a CAGR of 2.8 percent per year through 2050 and 1.4 percent in the following decade, only beginning to decrease starting in 2060.

32 Author's calculations based on OPEC crude oil reserves of 267 billion barrels and 0.3714 tCO_2/barrel from 'Carbon Majors: Accounting for Carbon and Methane Emissions 1854-2010 – Methods & Results Report'

Solar mini-grid in Les Anglais, Haiti.

Investing in Low-Carbon Universal Electricity Access in Latin America and the Caribbean

Through its Low Carbon Energy Fund, the IDB Group (Inter-American Development Bank, IDB Invest and IDB Lab) aims to electrify the remaining 17 million people who lack access to power in the Latin America and Caribbean region, while also transitioning away from fossil fuels. This initiative will drive economic development, community resilience, and further investment from other public and private sector organizations.

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The Alliance has a simple founding mission: To expand opportunity for the half of humanity that is still in energy poverty while also cutting the carbon emissions that drive climate change. This is not just a feasible course. It is the only sustainable path to take.

Photo Credit:
Power Africa/Roy Potterill

A Call to Action

Energy and income are so closely linked that connecting every community to a source of high-quality electricity could spark the global development gains the world has sought for a century.

If you combine all the people who live in the U.S., Brazil, Nigeria, and the entire European Union, and then triple that number, you'll have roughly the population now living in some form of energy poverty.

That deficit dramatically limits the lives of around 3.6 billion people. It diminishes their comfort, education, health, safety, and economic opportunity.

We can change that reality, using clean energy technology. This is the only way to open opportunity to the rest of the world while confronting the looming catastrophe of a warming climate.

The other path – combating energy poverty with still more fossil fuels – would ensure climate disaster.

The Alliance was formed to help blaze a more equitable and sustainable path – to bring power to those who now lack it via new clean energy. Working together with developing countries, the Alliance seeks to foster collaboration and unlock access to the considerable human and financial resources needed to scale a just energy transition.

To make this happen, we need urgent action on three core priorities:

1. **Enabling Environment:**
   We need to **improve market access** in developing countries to speed the entry of private-sector solutions. This requires clearer laws, more transparent regulations, and expanded expertise to assist governments in partnering with private-sector operators.

2. **Innovation & Entrepreneurship:**
   Clean energy installations have boomed in developed economies. We need **swifter innovation** to assure these technologies are accessible to developing countries. Where relevant, we should assist with the development of technologies and business models better suited to challenging environments.

3. **Risk Capital:**
   In 2021 alone, new clean energy projects produced 25% of the electricity needed to end energy poverty, except nearly all of this went into developed economies. We need to **direct vastly more capital into energy-poor countries** so that they too can benefit from the ongoing clean energy revolution.

Only through collaboration and urgent action can we create a just and sustainable world for all. We have the ability, and we must act now. Together, we can help end energy poverty, spark global development, and assist in a just energy transition.

Together, let's change energy for good.

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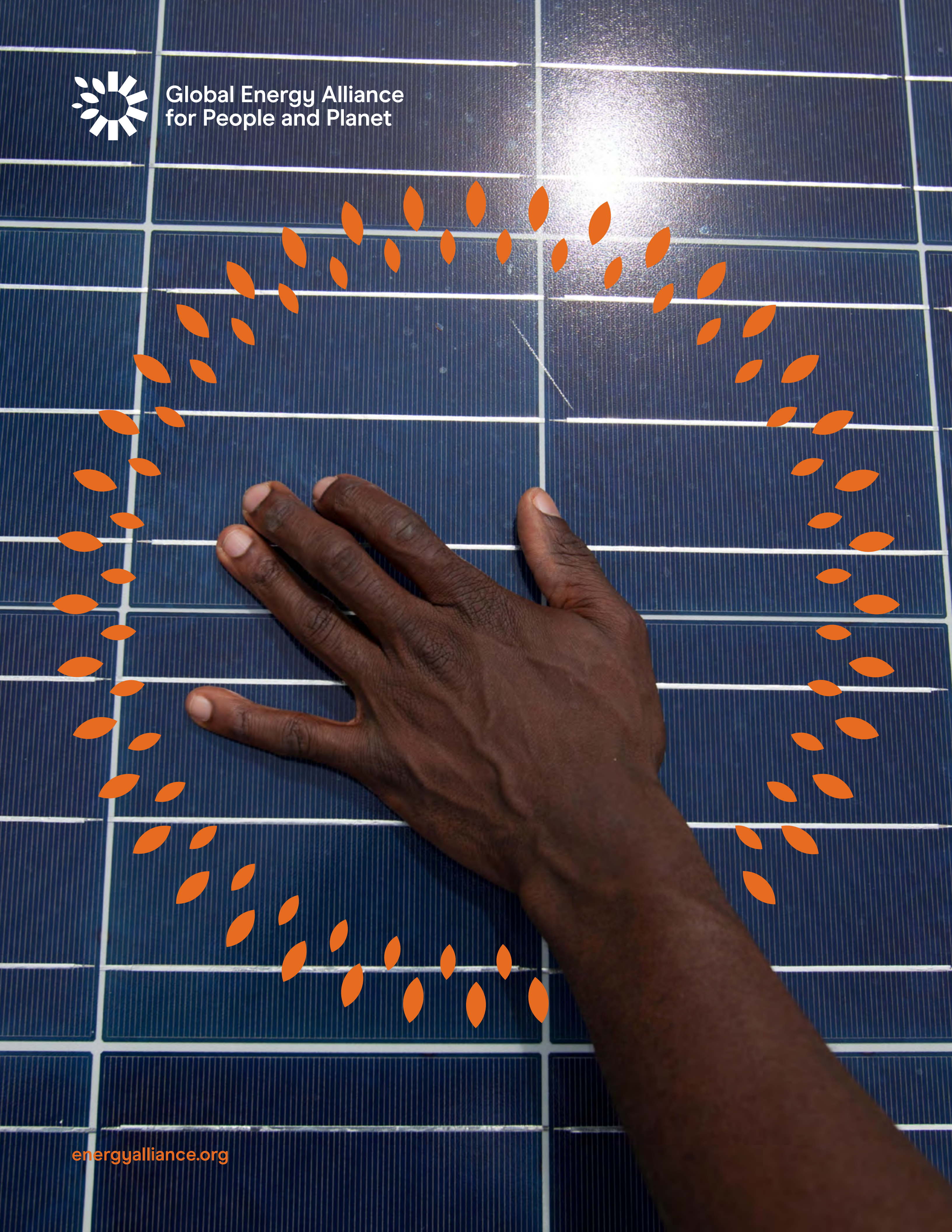
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