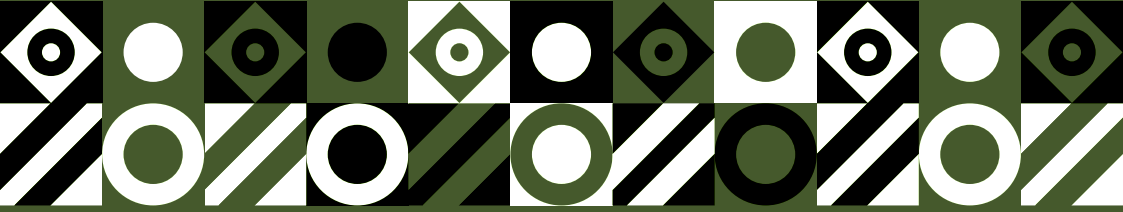


SUSTAINABLE ENERGY SCOPING REPORT



REAPING THE REWARDS OF SUSTAINABLE ENERGY

Building an Africa-Europe partnership
for a clean energy future



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INTRODUCTION

In the face of a climate emergency and as both continents come to terms with the realities of the COVID-19 pandemic, there is a new sense of urgency for Africa and Europe to come together to modernise and revitalise not only their formal relations, but also the underlying narrative.

Both have a shared interest in implementing Agenda 2030, tackling global health crises, combatting the climate emergency, ensuring food security and forging better connectivity.

While 2020 has opened up new space for Africa and Europe to reimagine their relationship and agree on areas for deeper cooperation, 2021 will see ideas turned to action, as the two forge ahead in revitalising their relationship.

This landmark year includes plans to hold the 6th African Union-European Union Summit, as well as to deepen the Africa-EU partnership across multilateral fora including COP-26, the UN Summit on Food Systems, the UN high-level dialogue on Sustainable Energy and the Global Health Summit.

As Africa and Europe embark on this renewed partnership, Friends of Europe and the Mo Ibrahim Foundation are delighted to play a role in driving an ongoing and

strategic conversation through the Africa Europe Foundation Strategy Groups. These independent fora will aim to influence decision-making, offer innovative proposals for impactful initiatives, and build inclusive networks with the will to create positive change.

Meant to advise and provoke the Strategy Group, this scoping report represents a starting point. It provides a state of play on the issue at hand, an overview of challenges and opportunities, and a selection of case studies from across both continents. It also includes initial recommendations of points for discussion and a list of guiding questions to drive debate.

The report also encourages the reader to keep in mind the cross-cutting themes which should underpin all Strategy Groups: climate, youth, gender, SMEs, governance and mobility.

We hope that you find the contents of this report informative, and that they help you to start thinking differently about the issues.

While extensive, the contents of this report are by no means exhaustive. We look forward to digging deeper into the issues with you in the months and years ahead.

EXECUTIVE SUMMARY

Africa and Europe are closely interconnected. Our common histories, strategies, and institutions offer an opportunity to re-design how we work together for the common good.

The scale of the global climate emergency and the depth of economic and social damage from the COVID-19 pandemic demonstrate the importance of transforming our economies, to make them more resilient and better aligned with the objectives of the Paris Agreement. People and governments around the world are searching for ways to re-build economies and lay stronger foundations for climate-safe growth.

COVID-19 has shown how unprepared the global community is to deal with disasters on this scale and revealed tendencies to retreat into nationalistic approaches. This raises serious concerns over our readiness to deal collectively with the impact of climate change. However, it also provides us with insight into what is required to improve resilience. Perhaps, the greatest lesson we can learn from the pandemic is the critical importance of collaboration, at all levels, among citizens and between regions, countries and continents.

For Africa and Europe, this is the moment to steer recovery towards investment in a green transformation that builds resilience against climate change and leverages opportunities at the nexus between climate action and development. Sustainable energy provides a chance to steer both continents towards a green recovery that delivers growth and jobs.

The COVID-19 pandemic creates space for new ideas and strategies that can deliver the transformation all continents need. All countries are aiming to spur an economic recovery that revitalises hardest-hit sectors. The 'Build Back Better and Greener' message encourages governments to use post-COVID-19 recovery packages to strengthen inclusive and sustainable development which can deliver a just transition to a climate neutral economy by 2050. This new pathway offers great potential for joint action and investment by Africa and Europe working together on a vision for growth that aligns the Africa 2063 Agenda and European Union's Green Deal.

Africa and Europe should cooperate to develop joint responses to the climate crisis as well as investing in innovation for economic and social progress.

OPPORTUNITIES

- The African Continental Free Trade Area provides (AfCFTA) a framework for energy cooperation with potential to transform Africa's economy. As the largest trade area in the world, the AfCFTA should re-balance relations between Africa and Europe and create a more mutually beneficial partnership, notably in the energy sector.
- Renewables have taken off, with solar leading the way. However, a slowdown in improving access to electricity and the risk of under-investment in grids are warning signs for the future. The remarkable fall in the cost of renewable energy (whether solar or wind) has transformed the landscape for private and public investors, showing renewables can be more than competitive with fossil fuels.
- The COVID-19 crisis has squeezed oil and gas revenues and investment, forcing producers to reassess their strategies in line with technological and policy shifts. The crisis prompted a rapid reassessment of strategic options for major oil-exporting countries, such as Nigeria, Angola, Algeria and Egypt. The risk of stranded assets has become very real. Diversification away from fossil fuels is increasingly seen as a way forward.
- Achieving the Paris Agreement objective of net zero emissions means ramping up clean technology deployment while continuing to reduce costs and improving efficiency, especially through innovation in renewable hydrogen and other low-carbon fuels, battery storage and Carbon Capture, Utilisation, and Storage (CCUS). There are many technical and financial options for spreading effective climate-smart technologies across Africa and Europe, including clean cooking, air conditioning and electric mobility. They could bring significant public health benefits, especially to women and children.

Progress demands a joint effort by all stakeholders. Governments, corporations, SMEs, farmers, city dwellers, NGOs, local communities, researchers and others need to collaborate and form alliances at local, national and regional levels to explore solutions.

MAIN CHALLENGES

- Electricity generation has to be greatly expanded to meet current needs and Africa's growing demand. The gap between demand and supply leaves 630mn Africans without access to energy in Sub-Saharan Africa alone. That lack of access for both residential and commercial users causes significant health and economic harm.
- Connectivity does not always guarantee access to reliable power. The expansion of national grids in Africa is estimated to have stalled in recent years and even in areas where the grid is accessible, service is often unreliable. Improving the grid and promoting decentralised energy systems have the potential to increase the provision of electricity across all the Regional Economic Communities (RECs) of the African Union.
- Transition to a sustainable energy model requires a significant increase in investment that combines local, national and global finance. African countries continue to pay very large risk premiums relative to other borrowers, despite the pool of global capital seeking a productive use. It is also estimated that despite being in the final decade of action to achieve the SDGs, current and planned investments are falling short to bridge the gap between energy access and demand.

Only profound changes, guided by sound policies, can deliver a better energy future. This is a choice for citizens, investors and companies, but most of all for governments. At country level, national policy frameworks can establish clear incentives for credible long-term investments linking the public and private sectors. To ensure long-term private energy investment is forthcoming, the right regulations must be adopted and implemented, with a clear vision and planning that looks beyond the short-term to the next 20 to 30 years.

SUSTAINABLE ENERGY

Energy is central to economic growth and transformation. The rich countries of today were able, over the last century, to harness fossil fuels to power their economies and achieve high levels of per capita income. Today, there is a wide gap between energy consumption in the EU and in Africa: per capita consumption of energy in Sub-Saharan Africa (excluding South Africa) is only 180 kWh per year, compared to 6,500 kWh in Europe.

If Africa is to achieve rapid rates of economic growth that raise living standards and bring about structural change, much more investment is needed in energy generation and transmission infrastructure. Energy efficiency must also be improved. It is estimated that African energy growth is mostly driven by biomass and waste (53%), followed by petroleum products (28%). The energy forms chosen by African countries in the future will have major consequences for global climate change. Europe has a strong interest in helping shape such choices in favour of low-carbon solutions.

Energy generation and use are responsible for most greenhouse gas emissions. If Europe is to meet its ambitious targets for 2030 and 2050, it needs to achieve a rapid transition to low-carbon energy systems. Africa's per capita greenhouse

gas emissions are far lower than Europe's due to its far lower levels of energy use. The remarkable and rapid fall in renewable energy costs offers Africa a low-carbon pathway to growth which avoids the risk of stranded fossil fuel assets and infrastructure.

Speeding up energy transition in Africa and Europe requires major investments. The energy transition on both continents will be achieved more effectively through strengthened cooperation and a joint commitment to achieving the Sustainable Development Goals (SDGs). The COVID-19 context highlights the need to accelerate ongoing initiatives that reduce vulnerability to external shocks, increase the diversification of the energy mix and reduce dependence on primary commodity exports, including petroleum.

The development of renewable energy projects in Africa and Europe offers a wide range of benefits, including the potential to create millions of new jobs in the preparation and deployment of energy infrastructure. At the same time, Africa is an important source of minerals and rare earth elements, such as lithium, cobalt, nickel and copper which are key to renewable energy systems and storage.

STATE OF PLAY

LOW RESILIENCE AGAINST CLIMATE CHANGE

Climate change and environmental degradation are an existential threat to Africa, Europe and the world. To overcome these challenges, countries need a sustainable growth strategy that will transform them into modern, resource-efficient and competitive economies.

Africa is the continent that has contributed least to climate change. Yet it is the most vulnerable to climate impacts, a situation exacerbated by its limited adaptive capacity. This exposes Africa to challenges related to food security, water supply, biodiversity and climate-related diseases. Climate change also causes considerable economic losses, from flood-damaged infrastructure to drought-related crop losses. The United Nations Office for Disaster Risk Reduction (UNDRR) estimates that climate change-related disasters at a global level accounted for direct economic losses of \$2.2tn from 1998 to 2017; other disasters over the same period accounted for \$0.7tn. The UNDRR specifies that in Africa, for 2014 alone, the economic impact of natural disasters amounted to \$53.19bn.

In Europe, the estimated costs of extreme weather events amounted to \$306bn in 2017, well above the 10-year average of \$190bn. Those costs are expected to rise further as global warming continues.

ENERGY PROFILES

Energy is vital for everyday life. Although rich in energy resources, Africa suffers from low levels of energy use. In 2018, Africans made up 17% of the world's population but they accounted for only 6% of global energy use. Nevertheless, energy demand is growing fast thanks to Africa's dynamic economies, population growth and rapid urbanisation.

Africa's total final energy consumption (TFC) is dominated by biomass fuels and waste. They accounted for 53% of TFC on average from 2010 to 2017, followed by petroleum products on 28%. In contrast, electricity, natural gas and coal averaged 9%, 6% and 3% of TFC respectively. Wind and solar accounted for less than 1%.

Despite this, wind and solar consumption has seen the largest increase, growing at an average rate of 37% over the 2000-2017 period. In comparison, consumption of biomass fuels and waste grew at an average annual rate of just 2% and petroleum products at 4%. Overall, Africa is a net energy exporter, selling 40% of its production.

In 2018, the EU produced 42% of its own energy, while 55% was imported. The Union's energy mix included petroleum products at 36%, natural gas at 21%, solid fossil fuels on 15%, 15% renewables and nuclear energy on 13%. The share of renewables in energy consumption has increased continuously since 2004, from 9.6% to 18.9%. The target for Europe is to achieve 32% of total energy needs from renewable sources by 2030.

Africa has made significant progress in increasing access to electricity. The number of people gaining access increased from 9mn a year from 2000 to 2013, to 20mn a year from 2014 to 2018. Nevertheless, Africa's electrification rate remains the world's lowest and progress is uneven across the continent. In Europe, energy poverty is a widespread problem: 50mn to 125mn people, or one-fifth of EU citizens, are too poor to afford sufficient indoor heating.

POLICY CONTEXT

The African Union and European Commission have placed energy transformation at the heart of their Agenda 2063 and Green Deal visions. These two projects represent a call to action for all segments of African and European society to embrace clean and affordable energy systems.

The AU's strategic Agenda 2063 vision also seeks to accelerate the implementation of energy sector initiatives that stimulate growth, sustainable development and regional integration. Among these initiatives are the Programme for Infrastructure Development in Africa (PIDA), the African Development Bank (AfDB) High Five initiatives, the African Renewable Energy Initiative (AREI), the Africa-EU Energy Partnership (AEEP) and the Sustainable Energy for All (SEforALL) Africa Hub. The AfDB's 'New Deal on Energy for Africa' aims to help the continent achieve universal electricity access by 2025 with a strong focus on encouraging clean and renewable energy solutions. This will require providing 160 GW of new capacity, 130mn new on-grid connections, 75mn new off-grid connections and providing 150mn households with access to clean cooking solutions.

Similarly, the vision of the EU's Green Deal is for Europe to be the first climate-neutral continent. It foresees an end to net emissions of greenhouse gases by 2050 and a decoupling of economic growth from resource use while leaving behind no person

or place. To achieve this, the European Commission has proposed turning this political commitment into a legal obligation. The Energy Union is the main policy instrument to deliver this transformation. It aims to bring secure, sustainable, competitive and affordable energy to all EU consumers – whether households or businesses. The Energy Union Strategy is made up of five closely interrelated and mutually reinforcing parts: (1) energy security, solidarity and trust; (2) a fully-integrated internal energy market; (3) energy efficiency contributing to lower demand; (4) de-carbonising the economy; and (5) research, innovation and competitiveness.

THE COVID-19 CONTEXT

The COVID-19 pandemic has inflicted high human costs and trapped the global economy in an unprecedented crisis. The International Monetary Fund projects the world economy will contract by nearly 4.4% in 2020 and recover by 5.2% in 2021. African countries have been affected to varying degrees. According to the IMF, Africa faces a drop in real per capita income of 5.3%, a fall to 2013 levels. That represents an equivalent loss of around \$290bn in income for the region. In 2021, Africa's growth should recover modestly to 3.1%.

Pandemic disruption has triggered a significant drop in global energy consumption that has severely affected oil markets. According to the World Bank, Brent crude prices dropped by nearly 63% between January and April, from 63.6\$/bbl to an all-time low of 23.4\$/bbl. They increased slightly to 39.9\$/bbl in June and 41.5\$/bbl in October, but that's still 32% down from 2019. This has exposed vulnerabilities for Africa's principal oil-exporters.

The COVID-19 outbreak has pushed the EU economy into an unprecedented crisis. Demand for electricity fell by at least 15% during lockdowns. In Italy, at the height of the spring outbreak, electricity demand was

down by as much as 75% at times. The roll-out of green energy has been slowed with a decline of around 20% in related investment. Overall energy use is expected to be down by up to 6% by end-2020. That's seven times the impact of the 2008 financial crisis.

OPPORTUNITIES

The time has come to identify opportunities to unlock new avenues for economic and social development over the years to come. A just transformation to a greener economy should be the foundation for relations between the two continents.

POLICY FRAMEWORK IN PLACE

Much of the policy framework is already in place, opening up opportunities for accelerated change and new measures.

Many African and European countries have set out ambitious post-2020 climate action plans, known as Nationally Determined Contributions (NDCs) and National Energy and Climate Plans (NECPs). But further efforts are needed to improve resilience and create conditions for the “phasing-out of coal, increasing development of renewable energy in the energy sector, investing in low-carbon, electric and public transport in cities, developing sustainable power and land-use systems, including the restoration of forest landscapes, insuring direct investment towards resilient water infrastructure, and reducing emissions from major industrial value chains”.

The AU's Agenda 2063, the EU's Green Deal, the UN 2030 Agenda for Sustainable Development and the Common African Position on the post-2015 Development Agenda frame the socio-economic transformation needs, the challenges posed by climate change and the goals for African and European countries.

Both the AU and EU place Africa and Europe's energy transformation at the heart of Agenda 2063 and the EU Green Deal, under the objectives of ‘Economies and communities that are ecologically sustainable and resilient to climate change’, and ‘Making the EU's economy sustainable by turning climate and environmental challenges into opportunities, and making the transition just and inclusive for all’. These two visions are a call for all segments of African and European society to work together to build a prosperous and united Africa and Europe, based on common values and a shared destiny.

The strategic visions of the AU, through Agenda 2063, and the EU, through its Green Deal, also seeks to consolidate and implement various continental initiatives in the energy sector to stimulate growth and strengthen regional integration.

RE-DEFINING RESILIENCE

The current situation offers a unique opportunity to rethink the energy system and improve its resilience better to absorb future shocks.

It is clear that neither Africa nor Europe can return to the pre-COVID system once the pandemic is over. Both continents need to collectively redefine what resilience means, and to develop initiatives at the local, regional and international level to better prepare for shocks.

A reinvigorated reform effort is needed urgently to spur growth. Even before the crisis, many Sub-Saharan African countries required a fresh wave of reforms to lift growth, create opportunities for a wave of new job seekers and make progress toward the SDGs. These reforms are also needed to boost resilience and ensure that progress will not be compromised or derailed by future shocks. The cost of delay is now higher than ever.

The impact of climate change on hydrology in both Europe and Africa also underscores the need for a diversified energy mix and stronger regional power pools. Planning and investment decisions for energy infrastructure should be based on a combination of large- and small-scale systems that ensure climate-resilient connectivity within wider networks.

MODERNISING THE ECONOMY THROUGH CLEAN ENERGY

Clean energy offers a wide range of opportunities to modernise the economies of both continents. The current context has reinforced the urgent need to invest in African and European energy systems through the increased deployment of renewables.

Clean energy access would increase energy security, while creating green jobs in the installation, operation and maintenance of new infrastructure.

In Africa, the post-COVID-19 recovery demands a strategic energy rethink. The crisis has highlighted the urgent need to accelerate planned or ongoing initiatives that can reduce vulnerability to external shocks, diversify the energy mix and reduce dependence on primary commodity exports.

For Europe, the crisis underlines the importance of maintaining the momentum towards higher climate targets on the reduction of greenhouse gases, roll out of renewables and energy efficiency.

A clear regional economic policy framework is needed in Africa to integrate these visions into a broader context of value creation and employment opportunities. Renewable energy can increase diversification, expand access to electricity and clean cooking and improve climate change resilience. Europe is currently starting to experience such benefits and can share the positive, as well as the negative, lessons of its different energy approaches.

THE INVESTMENT LANDSCAPE

Changing the investment landscape can attract finance which brings benefits for people and the planet.

If Africa is to achieve its goals for energy transition, access to energy and climate change adaptation, current investments need to be multiplied by five to more than \$2tn over 2019-2040. That's equivalent to 2.7% of regional GDP.

The transition to net-zero emissions will be positive for the European economy despite the significant additional investments required. EU 2050 climate plans foresee benefits of up to 2% of GDP.

Investments are primarily needed in grid extension, reinforcement and maintenance; low-carbon power capacity; and decentralisation. Identifying bottlenecks hampering new energy investments, as well as the choice of capital providers, can make a big difference to the pace and affordability of Africa's shift towards more reliable, sustainable and affordable energy.

There is growing recognition that expanding energy provision requires both public and private investment because of the large-scale and high-risk nature of the infrastructure. Long-term private investment will only be forthcoming where there are clear, legal contracts covering 20 to 30 years, such as Power Purchase Agreements.

MAKING THE MOST OF RENEWABLE ENERGY

Endowed with very significant renewable resources, Africa is in a strong position to power its future economic growth with low-carbon, sustainable and resilient energy.

Although renewable energy is growing fast, it is still far below potential. In 2019, new renewable energy capacity amounted to 50GW, but it is estimated that hydropower alone could generate close to 1,200TWh per year, three times the current level of energy consumption in Sub-Saharan Africa.

Africa's solar energy potential is huge. Most of the continent enjoys more than 320 days of sunshine per year, twice the average level in Germany. Wind energy also offers major opportunities but they are less evenly distributed.

Beside such renewable resources, Africa holds abundant supplies of natural gas, which is seen as a valuable back up to variable renewables and an important transition fuel before hydrogen and power-to-x technologies become available.

Decentralised power systems and off-grid renewables can play a crucial role in widening access to clean energy for all as foreseen in SDG7. It can help reduce losses during transmission and distribution and ensure access for remote communities where grid extension is unfeasible. In that way, renewable energy can improve energy supply security, which is essential for reducing vulnerability to external energy price shocks.

Accelerated deployment of renewable energy, through far-sighted industrial policies and targeted skills development, has the potential to create millions of new jobs in Africa. At the global level, doubling the share of renewable energy by 2030 could increase GDP by up to 1.1%, roughly \$1.3tln. The impact of renewable energy deployment on global welfare is estimated

to be even larger, creating an increase of up to 3.7%. Global employment in the renewable energy sector would increase from 9.2mn, to more than 24mn by 2030. It would improve health services, especially in remote areas, and support the empowerment of women who accounted for 35% of the renewable energy workforce in 2016.

Africa has the potential to install 310 GW of clean renewable power by 2030. That would meet nearly 25% of the continent's energy needs. Achieving those levels requires a six-fold increase of the capacity installed in 2019. Regulatory reforms, policy innovation, mobilisation of investment and development of human skills will all be needed to make that change a reality.

IMPROVING THE TRADE SITUATION

The African Continental Free Trade Agreement (AfCFTA) commits countries to removing tariffs on 90% of goods, progressively liberalising trade in services and addressing a host of other non-tariff barriers. Due to enter into force in January 2021, the agreement – when successfully implemented – will create a single African market of over a billion consumers with a total GDP of more than \$3tln. It will make Africa the largest free trade area in the world. Implementation of the AfCFTA has the potential to drive a green transition in both Africa and Europe, if low-carbon provisions are included in the agreement.

The agreement offers a new platform for expanding Africa's efforts in pursuit of sustainable and inclusive energy development at the regional level, including through regional power pools. Implementation will also provide a stronger domestic and regional focus to supply chain development for energy-related technologies, R&D and skills.

The AfCFTA also opens the continent up to investors from Europe, Africa's largest

trading partner. The agreement offers remarkable opportunities for investors to achieve continent-wide success, but it comes with risks due to the lack of inbuilt investor protection. While trade in the AfCFTA age will be easier, investors will have to look outside for protection against unlawful state action.

Trade policies can also help build efficient supply chains and facilitate the movement of capital, people and information. Improved energy trade and energy integration initiatives can stimulate economic development in Africa by reducing transaction costs and promoting commercial and economic collaboration, especially with Europe.

IMPROVING HEALTH THROUGH CLEANER ENERGY

The impact of cleaner energy on health should not be underestimated. Clean cooking is a priority for many African countries given health concerns surrounding the use of traditional fuels. For example, Ghana has been promoting the use of liquefied natural gas (LPG) to replace traditional biomass for cooking. By 2018, 24% of the population relied on LPG. In Nigeria, LPG uptake is slowly displacing kerosene.

Many programmes support the distribution of improved biomass cookstoves and healthier alternative biomass-based cooking fuels, such as bioethanol, biomass pellets, briquettes and biogas.

KEY CHALLENGES

Energy transition has the potential to foster Africa's socio-economic development by sustainably reducing poverty and inequality. However, a successful transition requires a deep understanding of the major energy challenges facing the continent, which range from short-term shocks to complex structural challenges that have hampered energy infrastructure for decades.

SHORT-TERM

Access to energy

Although rich in energy resources, Africa suffers from precarious access to energy. In 2018, the continent was home to 1.3 billion people, or 17% of the world's population, but it accounted for only 6% of global energy consumption. Per capita energy consumption in most African countries is much lower than the world average (about 0.7 tonnes of oil equivalent (toe) versus 2 toe).

Dynamic economies, growing populations and rapid urbanisation mean energy demand outstrips supply in many countries.

COVID-19 has further exposed Africa's energy sector vulnerabilities, resulting in supply and demand shocks and increased pressures on existing energy systems.

Lack of access to electricity is a major impediment to development. Africa has made significant efforts to increase access to electricity but its electrification rate remains the world's lowest and the situation has worsened with the economic fall-out from COVID-19.

Latest IEA estimates show that achieving Africa's goals for energy access will require investment to increase to a cumulative \$1tn during the 2019-2040 period, roughly equivalent to 1.6% of GDP.

Clean cooking

Lack of access to clean cooking is a persistent issue in Sub-Saharan Africa. Access increased only marginally, from 15% in 2015 to 17% in 2018.

Adoption of cleaner cooking stoves has increased in some countries in West and East Africa. However, the number of people without access surpassed 900mn in 2018, underscoring the fact that population growth is outstripping efforts to ensure clean cooking.

Households rely on traditional biomass and solid fuels, such as wood, charcoal, manure,

crop waste and coal. All pose significant environmental, health and economic risks. Use of traditional biomass for cooking is believed to be directly or indirectly responsible for nearly 500,000 premature deaths per year in Sub-Saharan Africa.

In addition, deforestation and the resulting fuel scarcity adversely impact millions of people, mainly women and children, who often bear responsibility for fuel collection and cooking. Fuel collection is one of the biggest contributors to women's workloads in low-income countries, taking up time which could be spent on more productive activities.

Progress in deploying improved biomass cookstove solutions has been slow due to lack of finance and scale. Supply chains for clean solutions are poorly developed, and consumer awareness, accessibility and affordability continue to be a challenge.

Responding to COVID-19

As a result of COVID-19, price volatility in oil markets has amplified the resource curse and forced a reassessment of the risk posed by 'stranded assets' in the form of petroleum reserves. The shock is particularly strong in oil-exporting countries, most of which were already experiencing economic recessions following the 2014 oil price collapse. The impacts in Angola and Nigeria, where energy products respectively account for 88% and 76% of export revenues, are particularly severe.

Cash flow cuts due to COVID-19 have also pushed many energy supply companies into deep trouble.

MEDIUM-TERM

Changing the investment mindset

Energy transition in Africa requires investment funds to keep pace with sustainable infrastructure needs. Yet, there is a large shortfall in finance for investment which severely limits the scale and speed of energy

production and distribution on the continent.

The asymmetry in CO₂ and energy generation between the two continents represents a significant opportunity to achieve development goals and meet global climate targets, such as by using certified offset trading, which could represent a win-win for both economies – driving down net emissions while crowding in private capital to achieve low carbon growth.

Unstable electricity supply is often due to insufficient investment in new power generation capacity and the deteriorating performance of existing plants.

Mobilising private capital is hampered by a multitude of challenges. De-risking future investments has become a critical necessity for projects to become bankable. African countries need to step up efforts to address persistent barriers to investment, such as the lack of regulatory clarity or stable policy frameworks.

In the context of COVID-19, global energy investments are expected to decline by 20% in 2020, although, several clean energy technologies have shown encouraging signs of resilience. However, a number of uncertainties remain over the achievement of long-term climate and energy goals in the current turmoil. Leadership by governments, businesses and other decision-makers will play a central role in setting the pace of renewable energy deployment to put Africa's economic recovery on a more sustainable path.

There is a large and variable gap for sustainable energy infrastructure financing in Africa. In 2018, Africa received a total of \$43.8bn in financing for energy infrastructure. However, that high value does not reflect trends over the last five years, where investment in the sector averaged just \$26.3bn.

Improving the grid

In many countries, a single utility is responsible for the supply, transmission and distribution of electrical power. Low levels of efficiency and political interference, leave utilities struggling to adapt to rapidly changing circumstances and expectations.

To improve the grid, four main regional power pools have been set up – the Eastern African Power Pool (EAPP), the West African Power Pool (WAPP), the Southern African Power Pool (SAPP) and the Central African Power Pool (CAPP). Their objective is to secure power supplies and foster power system connectivity within the wider region. However, physical interconnections through the construction of cross-border lines have been slow to develop.

The grid infrastructure in much of Sub-Saharan Africa is poorly developed, leaving a large proportion of the continent in the dark. The high cost of extending the grid away from dense urban areas is one reason. While grid electricity is cost-competitive in large urban centres, extending it to remote areas requires costly infrastructure investments. This can lead to high electricity tariffs, which deter poor rural households from connecting.

Reliability of electricity

Reliability of electricity is another challenge. A number of sub-Saharan countries suffer from frequent power outages, leading to losses in economic growth, job creation and investment. Many companies have to invest in diesel generators to ensure continuous supply.

Power shortages are a particular problem for Nigeria, where the duration of electricity outages in 2018 averaged 4,600 hours, the highest in Africa. This is largely due to aging infrastructure, inadequate transmission capacity and constraints associated with most of the network.

According to a 2017 report from the African Development Bank, energy bottlenecks and power shortages cost Africa an estimated 2% to 4% of GDP per year. Companies in Tanzania and Ghana, for instance, report a loss of nearly 15% of their sales value due to power outages. In South Africa too, economic growth has often been compromised by limited electricity supply.

LONG-TERM

Diversifying the energy mix

Africa's energy mix needs more diversification. Its total final energy consumption (TFC) is still dominated by biomass fuels and waste, followed by petroleum products. Hydrogen has the potential to unleash a great increase in low-carbon energy, if the technology can be made cheaper and more readily available.

Reliance on biomass for cooking and heating leads to negative repercussions on human health due to in-house pollution and on the environment through smoke and loss of forest cover. In addition, over-dependence on fossil fuels, especially oil, exposes the continent to price volatility. Importing countries risk sudden oil price spikes which jeopardise their balance of payments, while price drops put exporting countries in great difficulty. Major exporters like Nigeria and Angola saw revenues plummet during the 2014 crisis and again in 2020 due to the pandemic.

Impacts of climate change on the energy sector

The impact of climate change on the energy sector in Africa is significant and likely to increase. Climate change is bringing rising risks to hydro-power generation which accounts for up to 90% of national electricity generation across Africa. Extreme weather events, such as droughts and floods, will occur with greater frequency and intensity, increasing variability in generation from hydro-electric plants.

CASE STUDIES

1. NOOR PROJECT, MOROCCO

- **What:** The NOOR project is a national programme for the development of solar electric power with a total installed capacity of 700MW
- **Where and when:** Morocco / 2016-present
- **Partners:** The Moroccan Agency for Sustainable Energy (MASEN), a public limited company, manages Morocco's renewable energy. The first stage of the project (NOOR Ouarzazate I) was financed by a consortium comprising the EU, World Bank, European Investment Bank, African Development Bank (AfDB), Kreditanstalt für Wiederaufbau (Germany) and the Agence Française de Développement (AFD).

THE NEED

Morocco is the only North African country without its own oil resources and has been the largest energy importer in the region. It has to meet growing local energy demand while keeping import bills under control.

In order to overcome its dependence on fossil fuels, Morocco developed a National Energy Strategy in 2009, which set targets of 42% of installed capacity to be obtained from renewable energy by 2020 and 52% by 2030.

MASEN was created in 2010 as a means to implement the energy strategy and manage renewable energy through the development of solar, hydro and wind programmes. NOOR Ouarzazate I was financed by a consortium with an investment of approximately MAD 7bn, equivalent to \$760mn.

THE OUTCOME

MASEN has so far developed its projects through long-term Public Private Partnership (PPP) schemes based on the Independent Power Producer (IPP) model. This institutional setup structures the relationship between MASEN, the Office National de l'Electricité et de l'Eau Potable (ONEE – Morocco's power and water utility) and the developer. Using the IPP model allows for an optimised risk allocation, while minimising the price per kWh. An international call for tenders was used to select a developer capable of building a power plant to the highest international standards at competitive prices. Other criteria taken into account included technical expertise and financial strength.

The electricity from NOOR Ouarzazate goes directly into the national grid and serves up to 1mn Moroccan households.

NOOR Ouarzazate I has also made considerable environmental and social gains, by preventing the emission of almost 280,000 tCO₂/year, making a major contribution to Morocco's greenhouse gas emission reduction targets, while creating jobs for the local workforce.

Subsequent phases of the NOOR Project have been carried out: Noor Ouarzazate II, with a capacity of 200MW, and Noor Ouarzazate III, with a capacity of 150MW, both use concentrating solar power (CSP) technology and were connected to the national grid in 2018. Three other plants, NOOR Ouarzazate IV (72MW), NOOR Laâyoune I (85MW) and NOOR Boujdour I (20MW), using photovoltaic (PV) technology were also connected in 2018.

WHY IT MATTERS

The success of the NOOR Project has been enabled by a favourable, comprehensive legal, institutional and regulatory framework set by Morocco's energy strategy. This includes: (i) law 16-08 on self-production, which raised the self-production threshold from 10MW to 50MW; (ii) law 13-09 on renewable energies, which provides a legal framework for the development of

renewable energy projects in Morocco, while also allowing for the supply and export of the electricity produced to both the local market and other countries; and (iii) law 54-14, which allows self-producers with a global capacity of more than 300MW to access the national grid and sell surplus production exclusively to the national utility ONEE.

Morocco has also established a number of public agencies and institutions, to better organise and structure the promotion of renewable energy development. These include MASEN, the Moroccan Agency for Energy Efficiency (AMEE), the Energy Investment Company (SIE) and the Research Institute for Solar Energy and New Energy (IRESEN).

The Noor Ouarzazate project is a national initiative that has been scaled up over time. It could be replicated elsewhere in Africa as the continent's huge solar potential is tapped.

2. M-KOPA, KENYA

- **What:** A solar energy company offering pay-as-you-go products and solutions
- **Where and when:** Kenya / 2011 - present
- **Partners:** M-KOPA

THE NEED

In recent years, Kenya has been one of the best performing countries in sub-Saharan Africa in terms of access to electricity. According to the IEA, its access rate reached 85% in 2019, up from 20% in 2013. This performance reflects increased efforts made by the national government notably through the Last Mile Connectivity project. Progress is also attributable to the development of decentralised power generation systems that benefited from government support through the Kenya National Electrification

Strategy (KNES) adopted in 2018. It was also helped by the development of a mature mobile payment infrastructure, which opened the path to digitalisation in the electricity sector. By enabling the emergence of innovative business models and payment mechanisms, this has been key to the development of off-grid initiatives such as Solar Home Systems (SHS).

THE OUTCOME

M-KOPA operates under a pay-as-you-go (PAYG) scheme. Customers make an initial deposit of approximately \$33.50, then pay daily instalments of \$0.48 via a Mobile Money Service (M-PESA) until the balance is paid. Clients can pay in daily, weekly or monthly instalments, which allows them to adapt payments to income. On repayment,

the customer becomes owner of the device. M-KOPA Solar's main selling point are the tiny daily repayments that are less than the daily cost of kerosene. Moreover, M-KOPA also provides information on consumer behaviour, which helps the business to grow. Initially, the project was piloted with grants that enabled M-KOPA to prove the viability of its concept and expand its business model.

The success of PAYG SHS solutions, like M-KOPA, in Kenya is down to several factors: the high cost of electricity from the main grid and the poor grid network; the global decline in solar photovoltaic prices, technological advances and market innovations; and especially the high rate of mobile money adoption and digitalisation which stimulated the deployment of mobile payment technology. That enabled solar service providers to remotely collect revenue from customers, reducing the operating costs and financial losses associated with collecting cash payments.

Despite success in Kenya and elsewhere in East Africa, PAYG SHSs companies face a series of challenges related to distribution and access to technical support. Poor digital literacy among potential customers is another drawback, particularly in areas where mobile phone penetration is still low. Moreover, the development of Internet of Things (IoT) solutions by PAYG companies can be a lengthy process and may not be viable for many small and medium-sized solar energy companies. Other challenges include the cost of data and services

provided by local network providers which are necessary for these technologies to function; and network reliability for remote monitoring and mobile payment applications.

WHY IT MATTERS

This example illustrates a successful decentralised approach to electricity access, as well as the role of digitalisation and innovative financing methods in providing cheaper electricity to rural households. The design of a PAYG model allows communication between consumers, the payment platform and the electricity supplier. Specifically, the model uses Global System for Mobile (GSM) or Machine-to-Machine (M2M) technologies in conjunction with mobile money software platforms to remotely monitor solar equipment and digitalise the payment process.

Economic benefits include new employment opportunities and improved productivity through extended work hours. The electricity delivered generates other social benefits, such as improved education thanks to extended study time, as well as improved health, safety and security.

M-KOPA was able to scale-up its project and raise equity from impact venture capital firms. The project was transformed from a pilot into a commercial venture. Recently, the company has invested in R&D of products and services while raising capital to support expansion through debt financing.

3.ESKOM, SOUTH AFRICA

- **What:** Originally established as the Electricity Supply Commission, this state-owned company is responsible for the generation, transmission and distribution of electricity to industrial, mining, commercial, agricultural and residential customers
- **Where and when:** South Africa / 1923 - present
- **Partners:** Eskom Holdings Limited (Eskom)

THE NEED

Eskom has a near monopoly in electricity generation and transmission in South Africa. It has experienced significant changes since its creation in 1923: the utility has undergone “periods of almost complete autonomy, increased regulation, an oversupply crisis, continuous power outages and massive increases in electricity prices”.

In 2017, Eskom generated about 95% of South Africa’s electricity and about 45% of all electricity on the African continent. Although its dominance in distribution is less pronounced, it still supplies about 58% of electricity to final customers. The remaining 42% is provided by municipal authorities.

About 90% of the electricity generated in South Africa comes from coal-fired power plants. Since the early 2000s South Africa has implemented a successful but modest renewable energy supply program: 2.2GW of renewable capacity has been built, drawing more than \$14bn in investment (Buckley, 2017). Eskom also operates Africa’s only nuclear power plant, Koeberg, located near the main load centre in Cape Town (Greenpeace Africa, 2012).

THE OUTCOME

Eskom has remained highly sensitive to the interests of mines and large companies because of its central mandate as an ‘engine of economic development’. It continues to invest in large-scale, centralised power generation. The politicisation of Eskom’s business, along with governance and operational misdemeanours over the past decade has resulted in several challenges. They include poor management and state capture which have led to political rather than economic factors influencing investment, procurement and pricing decisions.

The government has recently announced its decision to unbundle Eskom. The plan provides for the creation of generation, transmission and distribution subsidiaries, rather than complete legal and structural separation. Given the scale of the electricity crisis in the country and the extent of mismanagement and corruption, analysts believe the plan is insufficient to disrupt company culture and entrenched management practices.

Regarding decarbonisation, even though Eskom has a renewable energy supply programme in place, it has recently stonewalled on this front, refusing to sign agreements and claiming that renewable energy is too expensive. With solar PV and wind now significantly cheaper than new coal-fired power plants in South Africa, Eskom may have other unspoken reasons for blocking the development of renewables. One reason for the utility’s resistance is that Eskom is committed to a major expansion of coal-fired generation in the face of the decline of the South African electricity market. The company is building two huge coal-fired power stations, Kusile and Medupi, each with a capacity of 4.8GW, at an estimated total cost of \$34bn.

WHY IT MATTERS

Eskom's growing overcapacity and its failure to grasp the role of renewable energy in the new economy places the utility at serious financial risk. Its hugely expensive new coal plants must be paid for, regardless of how much electricity the utility can sell. The rise of rooftop solar is creating additional trouble for Eskom. This stands to grow by 8GW of capacity over the next decade, further eroding the utility's sales. Eskom could raise electricity

tariffs, if the government permits, and it could solve its overcapacity problem by closing old power stations in favour of expensive new plants. Such measures would undermine Eskom's claims that coal-fired electricity is the affordable alternative in South Africa.

More recently, South Africa decided to allow municipalities to source their own power rather than buying electricity solely from Eskom.

4. SILESIA REGION, POLAND

- **What:** Preparing the phasing-out of coal production in an active coal-mining region in line with EU energy and climate policy decisions
- **Where and when:** Poland / 2017 - present
- **Partners:** Region of Silesia and the European Commission

THE NEED

One of the biggest challenges facing the Silesia region in Central Europe has been the need to restructure its reliance on coal production and use. This requires not only changing the economic profile of the area, but also the replacement of traditional economic sectors through a long-term innovation and modernisation plan.

Restructuring traditional sectors must be accompanied by: the development of new economic activities; negative impacts of mining addressed; and human and social capital developed to improve quality of life. Cooperation is needed between scientific institutions and companies focused on R&D to stop the 'brain drain' of young people from the region and improve the quality of public spaces.

Financing this regional modernisation requires national legal changes. Private resources should be mobilised and combined with public funds at regional, national and EU level. Combining regulatory changes with public financial support should enable Silesia to develop a more competitive economy and improve life quality for citizens, while limiting social costs associated with this type of restructuring.

THE OUTCOME

In December 2017, the European Commission launched the Platform on Coal Regions in Transition. It aims to promote multi-stakeholder dialogue and help coal-mining regions identify, develop and implement projects to kick-start economic and technological transformation. Silesia is committed to the initiative and has actively taken part.

A programme adopted in 2018 outlines how to create conditions that support transformation of the Polish bituminous coal mining sector and make it profitable, efficient and modern. Elements include plans for a database of employee competences, employment activation and professional adaptation.

The Management Board of the Silesia region has been responsible for the largest Regional Operational Programme within the EU, with a total value of €3.5bn. Over €830m has been earmarked for the low-carbon economy, renewable energy sources and energy efficiency; and almost €1.5bn to support innovation, entrepreneurship, education, social rejuvenation, infrastructural revitalisation and developing the labour market.

WHY IT MATTERS

The process of transforming a region is complex and costly. Speeding up the process requires coordinated action at EU, national and regional levels. That includes legal action in the form of public assistance, regulating property rights in post-mining areas, facilitating investment and establishing flexible tools to revitalise the economy.

Given the economic transformations generated by globalisation and technological development, employees need to be fully equipped with tools they need to re-skill. Actions aimed at improving the situation of employees and jobseekers through support, vocational education and opportunities for professional qualifications have been carried out throughout the entire process.

5. THE SMART BORDER INITIATIVE, FRANCE AND GERMANY

- **What:** A flagship project to jointly build up integrated local energy systems in order to tackle energy transition challenges and opportunities at a cross-border level
- **Where and when:** Between Germany's Saarland and France's Grand Est Region / 2015 - present
- **Partners:** Co-financed by the Connecting Europe Facility of the European Union and involving 21 project partners

THE NEED

Regional cooperation has become a strong pillar of European energy policy. Preventive and emergency plans for energy crises, coordination and data exchange on power flows, regional action plans for interconnections, cross-border

smart grids, joint renewables projects and support schemes are all different manifestations of the regional approach in building a European Energy Union.

The objective of the Smart Border Initiative (SBI) is to implement the world's first cross-border smart grid at distribution network level in order to optimise cross-border energy flows between Germany and France.

Both countries have set ambitious energy transition objectives. Decentralisation and digitalisation are major drivers of this transition, and the successful implementation of integrated local energy systems will play a key role in reaching national targets. These systems will communicate with each other on a cross-border level and across different sectors.

THE OUTCOME

The SBI aims at enabling neighbouring regions within Europe to jointly build up optimised local energy systems. These systems take into account locally and regionally available energy sources; infrastructure, specific production and consumption characteristics; user structures from different sectors; and the clean energy goals of specific communities. The increasing uptake of new and improved technologies for decentralised energy systems offers new possibilities for such systems.

New generation smart grids follow a multi-sector approach. They contribute to developing integrated and optimised local energy systems, focusing on all kinds of energy supply, such as heating, cooling and electricity. The SBI is based on a new systemic approach.

Three closely interlinked modules will develop solutions allowing the integration of energy supply from various sustainable sources and will secure optimal utilisation of the local and regional infrastructure and resources:

An electricity and data backbone: optimising the development and operational process of the electricity distribution systems in the cross-border area, through an improved match of local electricity production and consumption at Distribution System Operator (DSO) level.

Smart mobility: optimising the development and operation of electric vehicle charging infrastructure.

Flexibility and sector coupling: integrating flexibilities provided by buildings and industries in the region and coupling the electricity and heating sectors through district heating and cooling systems.

WHY IT MATTERS

This is a crucial step for the European energy market. Distribution grids of two neighbouring regions will be connected for the first time through a multi-energy smart grid. They complete high voltage interconnections with local, mid-voltage integration at DSO-level. This offers new optimisation possibilities in managing the electricity balance. It also enables the local DSOs to jointly overcome challenges such as the increased share of intermittent renewable energies and the deployment of electro-mobility.

The SBI is planned as a replicable European project leading the way for further cross-border energy systems. This project offers possibilities for experimental smart grids to optimise electricity distribution systems, smart mobility solutions and multi-energy sub-systems.

It provides an opportunity to assess socio-economic benefits through cost-benefit analysis. Project partners can identify regulatory hindrances to better DSO integration and solutions to adapt regulatory patterns, for an integrated EU energy market.

6. THE NORTH SEA ENERGY COOPERATION (NSEC)

- **What:** An intergovernmental agreement bringing together nine European countries with the aim of improving conditions for the development of offshore wind power in the North Sea
- **Where and when:** North Sea / 2016 - present
- **Partners:** Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Norway, Sweden and the European Commission

THE NEED

Offshore wind can make a major contribution to efforts to decarbonise the economy by 2050. The European Commission expects the EU to produce at least 240GW of global offshore wind power capacity by 2050. Europe currently accounts for 80% of global offshore wind capacity and is the dominant region in terms of technologies and manufacturing. Offshore wind has generated 210,000 jobs in Europe, a number set to increase with further investment.

THE OUTCOME

Technological progress and significant cost reductions have transformed offshore wind into a safe and commercially viable form of clean power.

Offshore wind projects can be slower to get going than onshore equivalents because turbines are more costly to set up and connect to the grid.

In the longer run, offshore wind has numerous advantages: a much bigger fleet of turbines is possible; offshore wind power has a higher and more consistent output; offshore projects are less likely to run into objections from citizens.

NSEC prioritises four areas: maritime spatial planning; development and regulation of offshore grids; finance for offshore wind projects; and standards, technical rules and regulations for offshore wind.

The 2020-2023 work programme emphasises the development of cross-border offshore wind and grid projects (hybrid projects) with the potential to reduce costs and space of offshore developments.

WHY IT MATTERS

The NSEC supports offshore grid development and the region's renewable energy potential. This is a long-standing priority for the EU and participating countries.

The IEA offshore wind report argues that far more could be done to tap this technology's vast potential as a clean 'variable baseload' technology that can fully complement other energy sources and help integrate energy systems more effectively. Offshore wind has a greater capacity and more stable output than onshore wind or solar power. It can generate electricity at all hours of the day.

The global prospects for offshore wind are improving as costs of production fall rapidly. According to the IEA, 'levelised costs of electricity' produced by offshore wind are now below \$140 per MWh and are due to decline a further 40% by 2040. That makes it competitive with other renewables and natural gas.

FOR THE STRATEGY GROUP'S CONSIDERATIONS

POTENTIAL ACTION AREAS

- Pay special attention to R&D, science and technology. Knowledge-sharing could involve: deepening scientific collaboration and networks; establishing African and European centres of excellence working together to strengthen the science-policy interface; setting up monitoring processes and observatories; and investing in education and training.
- Support governments in designing a 10-15-year plan, based on a long-term shared vision. It should be developed with stakeholder engagement and analysis. Actions and investments are needed by public structures, private companies and community groups, working on local, national, and regional scales. Agreements on 'energy compacts' provide one valuable mechanism to generate commitments and monitor progress, so areas needing further investment can be identified early and addressed. Depending on the choices made, regulatory changes and technical assistance must be identified and put in place. Public funds should be allocated to support this approach, such as by establishing a credible framework for policy makers and investors to commit 10-15-year funding with appropriate subsidies for delivering energy transitions and access.
- Establish an African Energy Leaders' Group in the form of a Public-Private Partnership Platform (PPPP). Bringing together high-level decision-makers, this platform could champion energy delivery and encourage cross-fertilisation of ideas and experience in delivering energy transitions and access. It will help matchmaking between EU and African businesses and investors and create momentum through peer-to-peer learning. Within the group, targets could be agreed on aspects of power delivery, such as:
 - Mini-grids: to enable 10 fast-track countries across Africa to achieve their targets, then using these as examples to scale-up progress elsewhere
 - Dysfunctional state utilities: to help five struggling power utilities through regulation, finance, planning, training/ capacity building, knowledge transfer, mentoring and EU technical assistance
 - Innovation and emerging technologies: to achieve progress by spurring innovation and facilitating exchange of technologies between the two continents. Establish a partnership on technologies that are not yet mature but offer great potential, for example renewable hydrogen, geothermal and offshore wind.

GUIDING QUESTIONS

1. How to re-design energy architecture to combine central and decentralised power provision for urban and rural areas?
2. What are the challenges and opportunities in upgrading and integrating grid, mini-grid and off-grid generation to enhance energy efficiency and access?
3. How to diversify energy suppliers away from reliance on a single state utility to include community generation alongside private sector supply?
4. How to design credible long-term regulatory frameworks, including public-private partnerships and independent power purchase agreements?
5. How to make the energy sector more resilient in the face of the climate emergency?
6. How to ensure a climate-friendly and just energy transition that benefits both Africa and Europe?
7. What can be done to manage the use of gas as a transitional fuel while moving towards a climate-smart future?
8. What timeframe should be established to address stranded fossil fuel assets?
9. How can Europe lower its dependence on rare earth minerals for its own transition to a climate neutral economy?
10. How can the nexus between health, agriculture, transport and health be enhanced through the provision of clean, affordable, reliable and competitive energy?

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