Sustainably Unlocking Access to Energy
Leave No One Behind

The world's energy transition will impact African countries and people differently. But one important question remains: how can we collectively make it fair and inclusive? With appropriate technology, good collaboration between public and private actors, education and funding support, energy access, effective climate action and social development in Sub-Saharan Africa, all goals are achievable.

"*The trick is to manage the money,*" explains Fiona Ssozi, a researcher at Kampala's Makerere University. Ssozi's mobile-phone application, the fruit of her PhD studies at Cape Town University, is helping rural communities in Uganda manage the finances of local water-supply systems. "*Accurately tracking financial information is key to maintaining reliable supplies of clean, safe water,*" she says. "*That improves the quality of life in so many ways, from reducing health impacts to ensuring children are in school and not traveling miles to find water.*"

Ssozi's PhD studies were funded by Faculty for the Future, a Schlumberger Foundation program that supports education opportunities for women in science, technology, engineering, and mathematics (STEM) subjects. "*The funding meant I could undertake field work across Uganda and experience the problems isolated communities face,*" she says. "*I realized how much I could contribute, so I came home to Uganda to apply my knowledge through teaching and more applied research.*"

Dr Fiona Ssozi

Lami Nnamonu's career has followed a similar trajectory. An entrepreneurial scientist, Nnamonu is applying her academic research to enhance the productivity of Nigerian farms. Always a determined student — as a child, she went on a hunger strike until her father agreed to enroll her in secondary school — she became the first citizen of Sub-Saharan Africa (SSA) to earn a PhD in agrochemical technology. The Faculty for the Future funding made it possible.

Dr Lami Angela Nnamonu

Faculty for the Future - Launched by the Schlumberger Foundation in 2004

The Faculty for the Future has been awarding fellowships to women for PhD or post-doctoral study in STEM subjects since 2004 and now comprises a community of 770 women from over 80 countries, many in SSA. The flagship program demonstrates the company's commitment to quality education and gender inclusion. It provides female students with solutions that will impact not just their lives and careers but the ones of many others in their own country.

Both stories highlight the varied ways in which education drives social and economic development. Based on their own personal experiences, both women share a passion for empowering girls to embark on STEM studies and careers. Each has set up research and mentoring initiatives in their respective countries to promote a more equitable role for women in science disciplines.

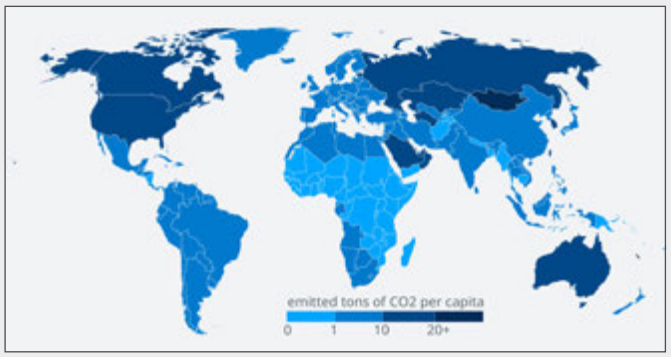
The Faculty for the Future and numerous other Schlumberger social-sustainability programs — from education, youth training and development to clean-water and health and wellbeing initiatives — reflect the company's long term local presence in SSA and other regions; its commitment is to go beyond business and promote social development where it lives and work.

SSA social-development needs are considerable. The shortage of modern energy services afflicting the region, for example, stifles economic growth and impairs many other development objectives linked to energy supply, such as the provision of quality health and education services, reliable food supply, and safe water resources. According to International Energy Agency (IEA) executive director Fatih Birol, half of SSA citizens still have no electricity access and as a region accounted for only 4% of global energy related CO2 emissions, despite being home to 17% of the global population. Meanwhile, around four-fifths of SSA's population lack clean fuels for cooking and continue to rely

on inefficient and unhealthy energy sources like wood and charcoal, damaging both health and productivity.

Earth at Night | Image courtesy NASA

To build a robust platform for economic growth and safeguard fundamental development-linked human rights, SSA must urgently confront the existential threat of energy poverty. But external geo-political and market forces are frustrating efforts to do so. Many foreign investors, seeking to reduce the emissions intensity of their portfolios, are selling their most emissive upstream assets. This trend is having a marked impact on SSA, where emissions intensity far exceeds the global average. Buyers include local companies reliant on external sources of financing. But with international lenders increasingly reluctant to fund projects they perceive to be emissions-intensive, funding shortages could jeopardize the continuity of energy supply, constrain economic progress, and harm social welfare. It is a cruel irony, given that SSA's historical and per capita emissions are small by comparison with those of other regions of the world.



Global Carbon Project 2020 | Image courtesy dw.com

Reflecting its sustainability approach, Schlumberger champions a more nuanced balance between climate action, nature, and social development. The company is applying solutions throughout its SSA activities that can create prosperity while reducing carbon intensity and respecting nature. Working towards that goal, Schlumberger collaborates with local communities and authorities as well as local and international players, leveraging its local culture, technology leadership and integration capabilities.

Investing in education and developing local talents

Schlumberger has been operating in Africa for more than 80 years and its SSA workforce is overwhelmingly staffed by local people. Nationals from over 20 African countries account for more than 85% of its employees across the region, giving the company uniquely localized insights into communities, cultures, and social challenges. The company takes a multi-faceted approach to generating in-country value and stimulating social development that starts with investment in education and developing local talents that are geared to local-job creation.

"*We underpin business initiatives such as these with investments in education and training to equip local people with the knowledge, know-how, and skills to compete with their international counterparts. I'm living proof of this. As a graduate from the Angola Technology Institute, I started my Schlumberger career in SSA before working internationally and then returning to Angola for my current role,*" *said Miguel Baptista, Schlumberger East Africa Managing Director.*

The company focus on education and training runs from school level to higher education and beyond to the workplace. It is often widely supported by Schlumberger volunteers that are passionate about spending their time in their local communities on activities ranging from science workshops to book reading programs.

The Schlumberger Excellence in Education Development (SEED) Program provides STEM education for young children who are particularly active in SSA. Schlumberger volunteers tour local schools to share their expertise and passion for science. In 2021, more than 1,000 students in SSA participated in SEED workshops and events. Following the COVID pandemic, the program's reach has been broadened to include distance learning and remote mentoring.

Schlumberger Excellence in Education Development (SEED)

SEED

SEED science book reading project in Nigeria
Image courtesy of Schlumberger

Support for local schools in Angola
Image courtesy of Schlumberger

Road safety workshop in Gabon
Image courtesy of Schlumberger

Young women in an energy engagement session at Makerere University, Uganda | Image courtesy of Schlumberger

"The SEED activities contribute significantly to science learning, creativity and the development of cognitive skills that favor the use of knowledge in other social contexts. It is very rewarding for us as volunteers to see the children's high engagement and how enthusiastic and proud they are to show what they have learned," said a Schlumberger SEED volunteer.

Other educational ventures include the creation of fully furnished science laboratories for two Angolan schools and educational programs in the Congo covering conventional science subjects, related areas like robotics, and sessions to sharpen learners' reading skills. In Viana, a municipality of Angola's Luanda province, a Schlumberger workshop teaches homeless teenagers welding skills and self-reliance.

The company is also committed to higher education. In addition to programs managed via the Faculty for the Future, Schlumberger has established tertiary-education scholarships in Nigeria and Equatorial Guinea, and regularly donates software licenses to universities across the region. All education initiatives aim to address gender imbalances and increase diversity, promoting a more inclusive approach to research and innovation.

The company has a long history of recruiting where it works and has developed strong ties with universities in order to attract the best talent. Schlumberger also deploys a strong internship program. In 2021, Schlumberger enrolled more than 30 interns in Angola and Gabon, to train as field-service and mechanical technicians, and field engineers. These internships develop broader capabilities through soft-skills training in subjects like English, IT, and communications. Around 60% of the 2021 cohort have now made the transition to full-time employment.

"Our recruiting team works closely with local universities to identify and develop talent across multiple domains, from reservoir engineering to digitalization, and we hire and train country nationals throughout our operations. These efforts have kept our national personnel ratio in Nigeria above 70% for several years," said Sops Ideriah, Managing Director, Schlumberger West Africa.

Developing local capacity and partnerships

Historically, Schlumberger has had strong ties with SSA along with a broad footprint and local presence. The first Wireline log in Nigeria was in 1952 and this year the company celebrates 70 years of operations there along with 70 years in Cameroon and 65 years in Ghana. The company continues to invest in in-country service operations. An Assembly, Repair, and Test (ART) center in Gabon for example, which opened in July 2021, provides and maintains specialist tools for local use. As well as generating skills and employment in Gabon's economy, this avoids greenhouse gas (GHG) emissions that would be incurred by freighting parts in and out of the country. Along with this, following the recent Tilenga project announcement, the company is increasing investment in building local capacity for Uganda, inaugurating a new office in the capital, Kampala, and looking to open another industry-leading ART center in the near future.

Prioritizing partnerships with local companies for the supply of essential products and services is another pillar of Schlumberger's in-country value approach. At the same time, providing these local partners with access to our technology and integration capabilities — the tools and know-how they need to develop upstream resources efficiently and sustainably — ultimately generates economic activity and strengthens local supply chains. This supports the creation of competencies that can be transferred to a range of other economic sectors, while at the same time promoting supply chain decarbonization.

Supplier fire drill training in Pemba, Mozambique
Image courtesy of Schlumberger

In 2020, for example, the company switched to local sodium chloride manufacturers to support operations in Soyo, Angola. As with all its partnerships, the selection process followed rigorous guidelines to ensure the new suppliers would meet high environmental, social, and governance standards. *"Schlumberger teams work closely with local suppliers to help ensure high quality sustainable services and products are at the core of their operations; delivering mutual benefit,"* said Baptista.

The partnerships are broad and constantly expanding. Recently ANPG, Angola's national upstream O&G regulator, signed an agreement with Schlumberger to fast-track its digital transformation with the rollout of AI and digital solutions, enabled by the DELFI cognitive E&P environment. The agreement, the first of its kind in SSA, highlights the growing trend of national institutions and E&P operators seeking to increase efficiencies, enhance exploration success rates, accelerate field development, and drive sizeable production gains, all while lowering carbon intensity.

Taking decisive climate action with positive local impact

The combined intention of Schlumberger's wide- ranging social programs is to create lasting impacts on social development and achieve commensurate, sustainable improvements in living standards. But those aspirations do not undermine its climate commitments.

The company enables climate action in three principal ways:

First, by taking an uncompromising stance on emissions stewardship on its core oil and gas activities. Schlumberger was the first energy-services firm to set a net-zero target for 2050, inclusive of Scope 3 emissions, along with 2025 and 2030 intermediate targets. The company has been driving, for some time now, GHG emission reduction associated with its own activity footprint at its facilities and in operations.

An ongoing shift to LED lighting and renewable electricity, for example, is set to reduce GHG emissions at two Nigerian facilities by 62% by year end. Cleaner-burning and hybrid vehicles are reducing the carbon footprint of vehicle fleets in Nigeria and Ghana. Grid connection enables facilities across the region to switch from diesel to lower-carbon natural gas or renewable hydropower. Supply-chain digitalization, meanwhile, is reducing waste and GHG emissions across our operations and those of its partners. Efficient fuel use is also making a difference. A new digital power-monitoring system, for example, is tracking and reducing energy consumption at the company's facilities in Gabon and a similar project will be operational in Angola by late 2022.

"Our decarbonization efforts are happening on several fronts as we speak," explains Ideriah. *"We're maximizing our use of cleaner energy sources, improving combustion efficiency, and leveraging technology to increase the renewable energy supply, thus reducing our scope 1 and 2 emissions."*

Beach cleaning in Senegal
Image courtesy of Schlumberger

Solar powered drinking water system commissioned by Schlumberger in Ghana | Image courtesy of graphic.com.gh

Ongoing 16 water wells project in Cabo Delgado, Mozambique | Image courtesy of Schlumberger

Second, Schlumberger's portfolio of market-leading technologies and solutions are deployed for customers to support their climate ambitions, enhancing efficiency throughout the oil and gas value chain and decarbonizing E&P operations. Their integration capabilities, refined over decades of experience, are also helping local companies design and develop cleaner and more cost-effective energy solutions.

Schlumberger Transition Technologies
Image courtesy of Schlumberger

Transition Technologies are one example of these carbon intensity reducing technologies. For instance, the Quanta Geo reservoir geology service combined with the Ora intelligent wireline formation testing platform enabled its client Eni to confirm hydrocarbons in place in just six months for a project in offshore Angola, while eliminating flaring-related greenhouse gas emissions. The company's capability in remotely operating a large set of Electro Submersible Pumps (ESPs), meanwhile, helps reduce travel requirements and associated emissions in South Sudan, all the while lowering service costs, mitigating safety risks, and empowering its customers to upscale operations with existing personnel.

"Along with the well-established and growing Transition Technologies portfolio, we have recently introduced to the market the Schlumberger End-to-end Emissions Solutions. SEES is a comprehensive set of scalable solutions for measuring, monitoring, reporting, and ultimately eliminating methane and flare emission,"
said Raphael Guerithault, Marketing and Strategy Director for Schlumberger Offshore Atlantic Basin.

Schlumberger End-to-end Emissions Solutions
Image courtesy of Schlumberger

Third, as part of its New Energy business, Schlumberger continues to invest in new energy technology ventures and innovative partnerships in strategic sectors which are low carbon, carbon neutral and carbon negative. The energy transition is characterized as the change from fossil fuels to cleaner sources of energy, mostly renewables. But the transition involves more than just switching to solar and wind infrastructure. Because the characteristics of renewable energy sources are so radically different, and because energy is so fundamental to every function in life, the transition will affect the functioning of all industries and other walks of life. Schlumberger is diversifying its portfolio of projects in selected markets and geographies where existing policies and regulations can make projects viable and sustainable. Today, their New Energy ventures sectors include Carbon Capture and Sequestration, Geothermal Power, Sustainable Battery-Grade Lithium, Geoenergy for Heating and Cooling and Hydrogen as an Energy Carrier.

While still a relatively new field of development globally, the potential is extensive and Africa is no exception. The continent's geographic diversity holds huge potential for solar, geothermal and wind power, and its soils are home to many of the minerals and rare earths needed for clean energy technologies.

Conclusion

The IEA hopes SSA can achieve universal access to electricity and clean-cooking fuels by 2030. At the same time, it wishes to see economic growth and prosperity rise without compromising efforts to combat climate change. These are challenging goals, but all achievable. Where carbon intensity is high, so are the opportunities for rapid decarbonization.

To be successful, companies need access to technologies and expertise that enable them to manage GHG emissions effectively, while supplying reliable and affordable flows of energy to underserved populations. With its industry-leading technology, integration capabilities, and support infrastructure, Schlumberger is in a unique position to help local energy providers achieve this balance and demonstrate the potential for sustainable asset development in the region.

The story is complex, but the opportunities are vast. A holistic approach is key, balancing the social agenda for the region with the global imperative of emissions stewardship. One thing's for certain however, Africa is well positioned, perhaps more now than ever, and there's a bright future in store for the region as it carves its path to unlocking energy sustainably.

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