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EXECUTIVE SUMMARY
ECONOMIC LETTER OF EAST AFRICA AND THE INDIAN OCEAN (EAIO)

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Off-grid electricity solutions in EAIO

In concise…

In order to improve access to electricity in East Africa, where 95 million people are still without it**, the International Energy Agency considers that decentralized renewable energy solutions - mini-grids, stand-alone residential or commercial solutions -** are the preferred means of increasing electrification rates in rural and isolated areas. Despite the presence of a large number of competing players active in these sectors - still largely financed by donors - French companies are already established and recognized in the region.

In detail …

Universal electricity access is a major socio-economic issue in EAIO

Electricity access rates, although steadily increasing in recent years, are very uneven in the region. While some countries are relatively close to achieving universal access (Kenya 75.0%), significant progress are still needed in other countries (Madagascar, 33.7%). Burundi especially stands out with a particularly low access rate (11.7%). Therefore, **improving access to electricity at an affordable price, particularly in rural areas**, for the 95 million people who do not have access to the amenity in East Africa (51.7% of the total population), is a major social and economic development issue, especially given the region's strong population growth.

Increasing access to electricity is also an opportunity to increase the production of renewable energy in the energy mix. While some countries benefit from an electricity mix on the national grid that is almost entirely renewable (Kenya: 90%; Uganda: 87%), others remain essentially dependent on gas or oil-fired power plants (Tanzania: 66%; Rwanda: 66%; Madagascar: 51%)[1]. In addition, many rural areas now rely on diesel generators that feed into mini-grids. Households also still rely heavily on wood, charcoal (sourced in a largely unsustainable way, a major cause of deforestation) or lamp oil/kerosene for lighting or cooking, especially in rural areas. The

[1] World Bank, 2020

share of the population using mainly clean cooking means is only 19.5% in Kenya (4.7% in rural areas); 4.5% in Tanzania (1.0%); and 2.4% in Rwanda (0.3%)[2] .

Off-grid solutions, which include mini-grids or stand-alone solar solutions (kits, solar lamps), **are cheaper alternatives to extending the national grid (which requires significant investment) and are more suitable for rural or remote areas. It is also a job-creating sector**. In Kenya, decentralized renewable energy solutions are estimated to have created 10,000 direct formal jobs (and 15,000 informal jobs) and it is projected that the sector could employ up to 17,000 people in the formal sector and 30,000 in the informal sector by 2023[3]. Most of the equipment is still imported, however, mainly from China, and increasing the local content of the products supplied (particularly for the assembly and reuse phases, etc.) remains an objective of the local authorities, and also a viable means of reducing costs for companies. Beyond access to electricity alone, **the development of productive uses or access to essential services** made possible by renewable energy solutions (water treatment, cold storage etc.) constitutes a vector of economic and social development for the populations with positive consequences in domains such as public health and food security.

… which is a priority for action and investment by governments and donors

Governments in East Africa have prioritized achieving universal electrification in the short to medium term. Kenya had a target of 2022 according to the National Electrification Strategy Action Plan of 2018, which has not been achieved, with a figure of close to 75% in reality today. Rwanda has set a target of 2024 to provide access to 100 % of households (70% through the national grid, 30% through off-grid solutions), while Tanzania and Uganda are targeting 2030. All of these targets are ambitious given the progress witnessed so far.

According to the *Africa Energy Outlook* published in June 2022 by the International Energy Agency (IEA), **achieving Sustainable Development Goal 7 in Africa would require investments of 25 billion USD per year**, equivalent to 1% of the world's annual investment in the energy sector or an LNG terminal. This would enable an additional 90 million people per year to gain access to electricity, and 130 million to use clean cooking facilities[4]. While it is estimated that 42% will gain access via extensions of the national grid, **mini-grids (31%) and stand-alone solutions (27%) are the preferred solutions for increasing electrification rates in rural and remote areas**, supported by the massive decrease in the cost of photovoltaic modules, which in 2020, were a tenth of their 2010 price. A cost rebound was however observed in 2021 due to tensions in the logistics chain and the increase in the price of raw materials (+50 %).

However, there are barriers to the deployment of these solutions. Mini-grids, while requiring smaller investment than grid extensions, generally need to be subsidized to ensure access to affordable electricity tariffs for the population. While solar lamps and kits are affordable solutions, they remain relatively difficult to access for the poorest households, while the low durability of these solutions, and the lack of affordable and sustainable maintenance services may lead, in some cases, to a premature disposal by households. On taxation, although efforts have been made within the East African Community (EAC) to harmonize the taxation of solar products, national implementations continue to diverge in some cases, thus increasing the cost of importation, which is then passed onto the final selling price. The lack of a clear and appropriate regulatory framework is also an obstacle to the deployment of off-grid solutions. Kenya, through its Energy Regulatory Authority, is currently reforming the regulatory framework for the deployment of mini-grids (harmonization of project approval requirements, tariff setting, licensing process). Regarding the management of electronic waste or the recycling of solar panels or solar lamps after use, no country in the region has a specific law or regulation.

Rural electrification still depends mainly on the support of bilateral and multilateral donors, via grants or loans. Following the example of the French Development Agency (AFD), which in Kenya is working with the public company in charge of distribution and marketing, KPLC (Kenya Power Lighting Company) on two projects: i) the retrofitting of 23 diesel mini-grids in Northern Kenya (through a 33 million euros loan); and ii) the Green mini grid facility, designed to provide grants and technical assistance to the private sector for the development of mini-grids, in which case the AFD is both the financial and implementation partner (through an EU grant of

[2] WHO, 2020
[3] PowerForAll, 2019. *Powering Jobs Census 2019: The energy access workforce*.
[4] Assumptions of the *Sustainable Africa Scenario* of the *Africa Energy Outlook, 2022.*

13.3 MEUR). **Numerous funds and financing facilities, notably in support of the private sector, exist to promote the deployment of mini-grids or decentralized solutions,** such as the Sustainable Energy Fund for Africa (SEFA), ElectriFI (EU), NEoT Offgrid Africa (Meridiam, EDF) or Spark+ Africa Fund.

The French private sector has invested in this sector, mainly through equity stakes and the deployment of autonomous solutions and infrastructure

The market for decentralized renewable energy solutions is characterized by a relatively large number of players and, **in all of the segments mentioned above**, **French expertise is already present**. However, it should be noted that the vast majority of equipment (notably solar kits, solar panels and batteries) are manufactured in Asia, including those supplied by French companies. Chinese integrators (Huawei for example) are also serious competitors. Larger mini-grid installations usually have more French or European content, whether in electrical equipment (inverters, hydro turbines if mini-hydro generation is possible) or in energy management optimization software.

The French giants Engie and EDF have accelerated their investments in the energy access sector in recent years, via buyouts or equity investments in local companies**.** For example, EDF is present in Kenya in the solar irrigation pump sector through its entry into the capital of Sunculture in 2018. Engie has acquired Fenix International and in 2019 the solar home systems company Mobisol, which operates in Kenya and is now present in the region as Engie Energy Access. Together with TotalEnergies, they are engaged in the **deployment of off-grid solar solutions** for the residential sector across the East African region: solar-home system (SHS) - solar kits installed on the roofs of homes, operating via the PayGo system - solar lamps, etc.

French consultants such as Tractebel (Engie Group) or EPCs such as Sagemcom are also present in the mini-grid or solarisation of telecom towers segments. For example, Sagemcom operates 16% of the off-grid production in Madagascar. French manufacturers can also be suppliers of components for decentralised installations such as Schneider Electric (inverters, electrical panels, or containerised solar solutions), HPP hydro (turbines for mini-hydro), CAPSIM (mini-grid design) or Elum Energy and Reuniwattt (energy optimisation software).

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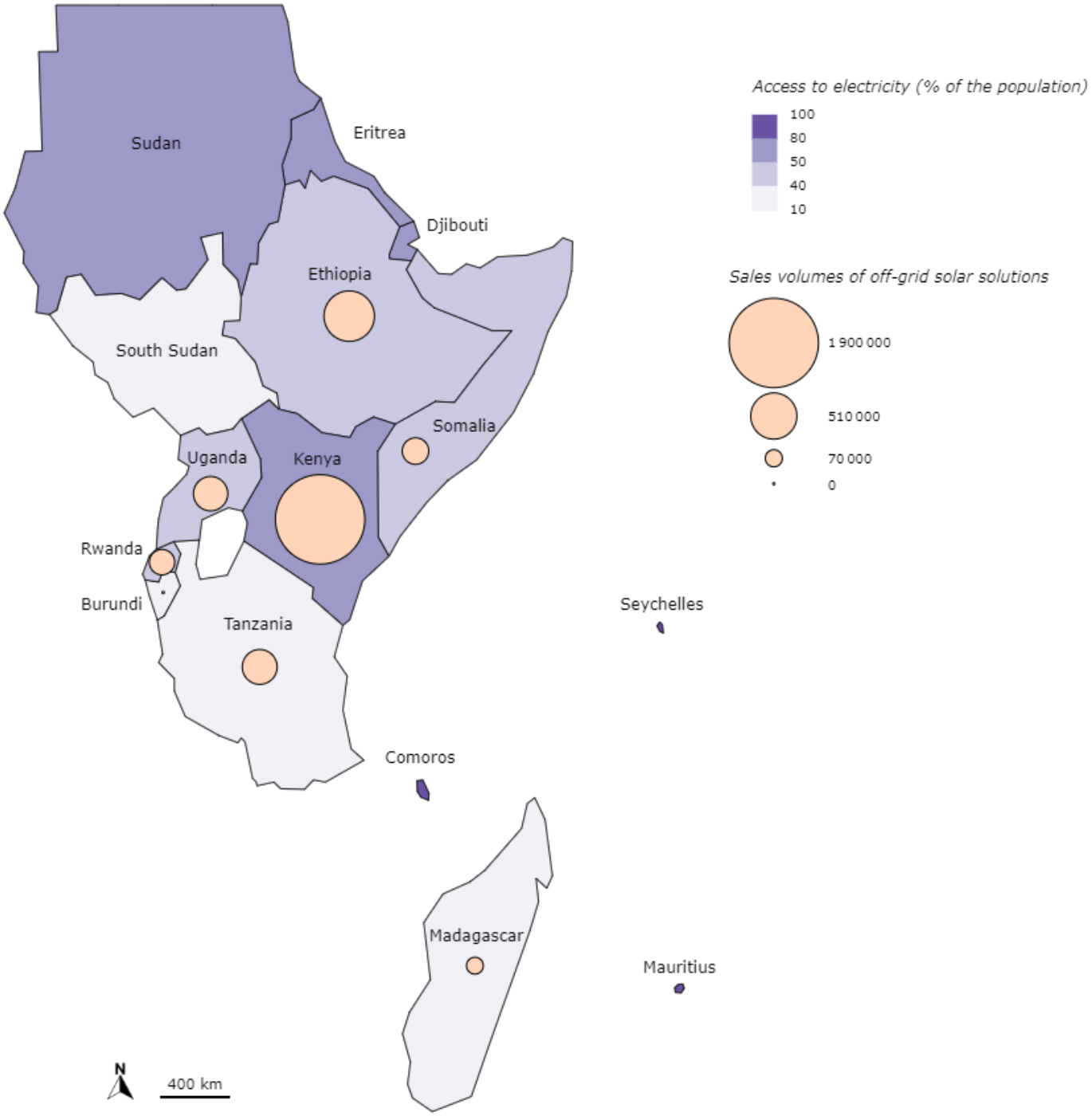
Graph of the month

Electrification rates (%) and sales volumes of off-grid solar solutions in EAIO in 2020[5]



Map edited by the Regional economic department with data from the World Bank and GOGLA.

[5] Some countries in the AEOI zone have not been studied specifically in the context of this letter, due to a lack of available data or a very low penetration of off-grid solutions (South Sudan, Eritrea, Mauritius, Seychelles, Comoros).