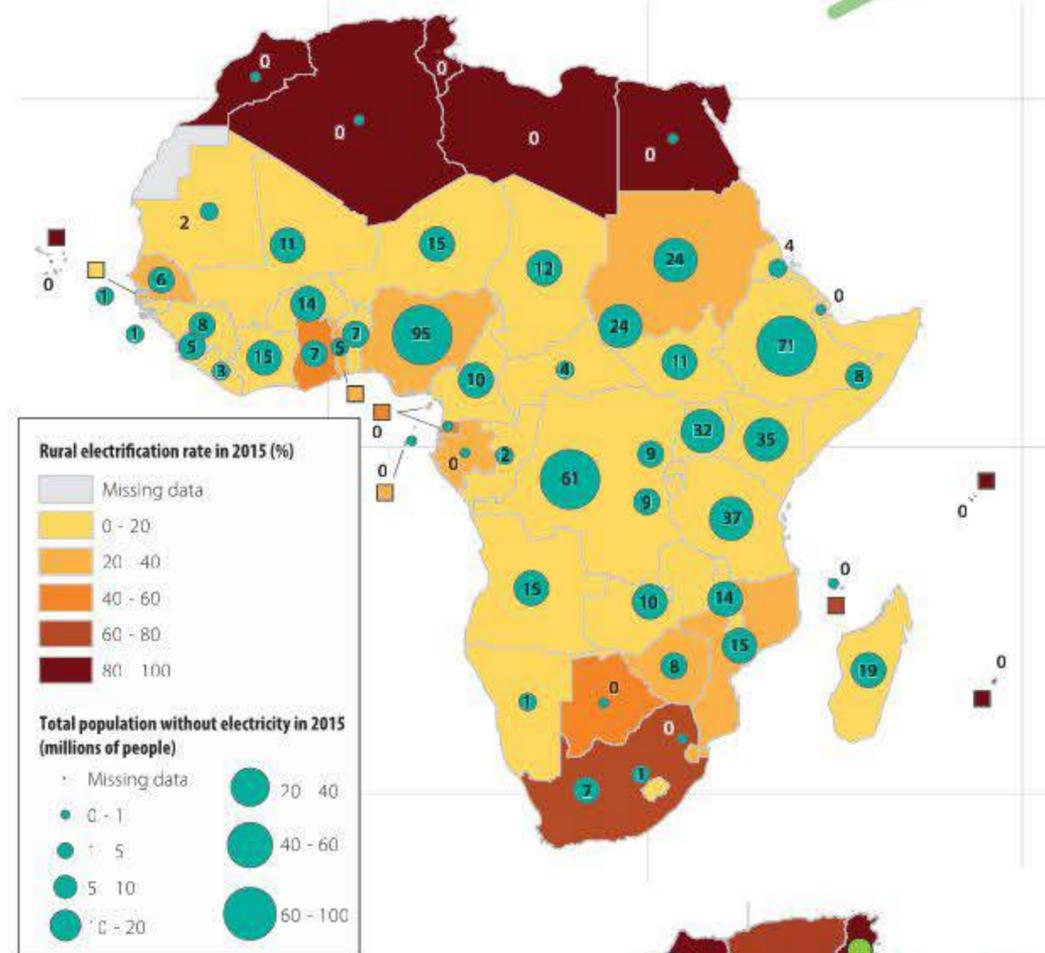


M25. People's access to electricity in 2013

Source: IEA, World Energy Outlook 2015



M26. Light of the cities at night

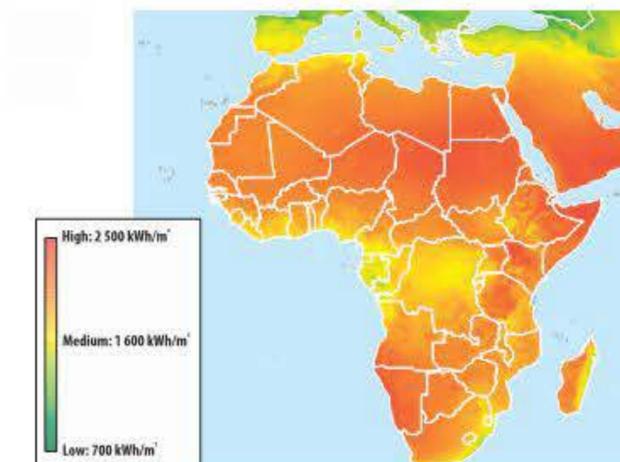
Source: Ginkgomaps



M27. Global solar radiation

Annual average in kWh/m²

Source: PVGIS - JRC 2001-2008



M28. Subscriptions to mobile phone services in 2014

Source: WDI 2015

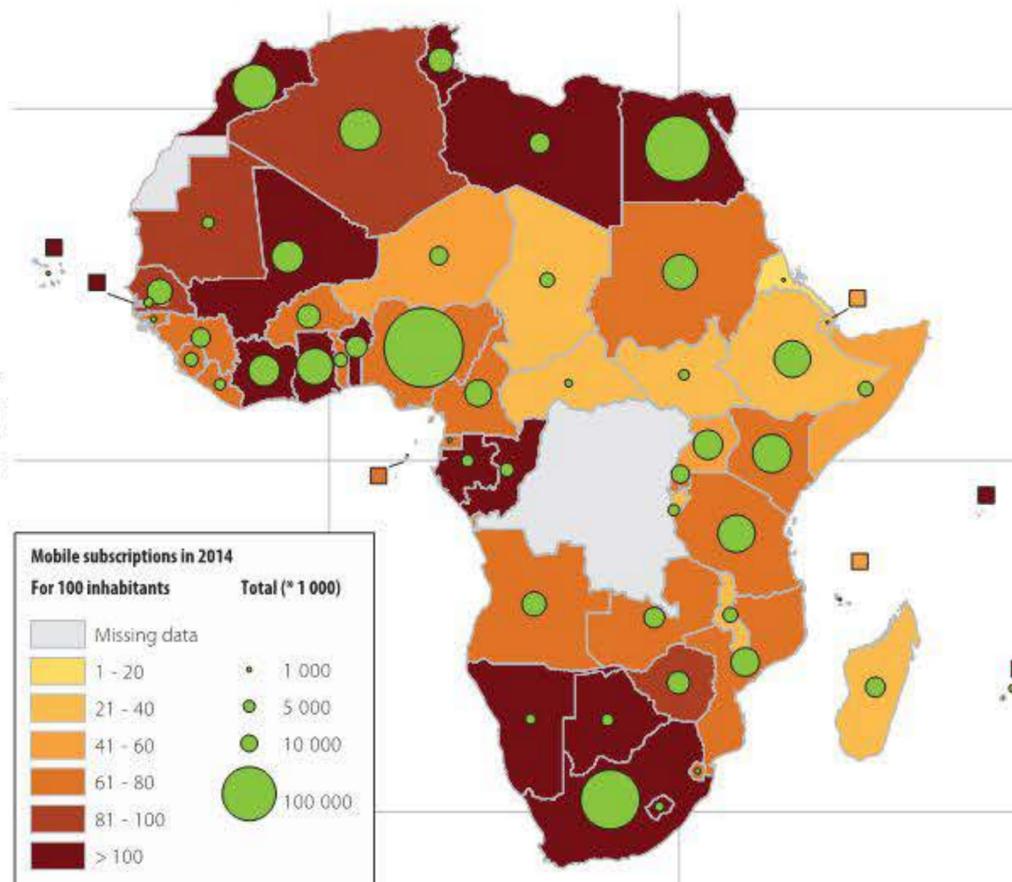
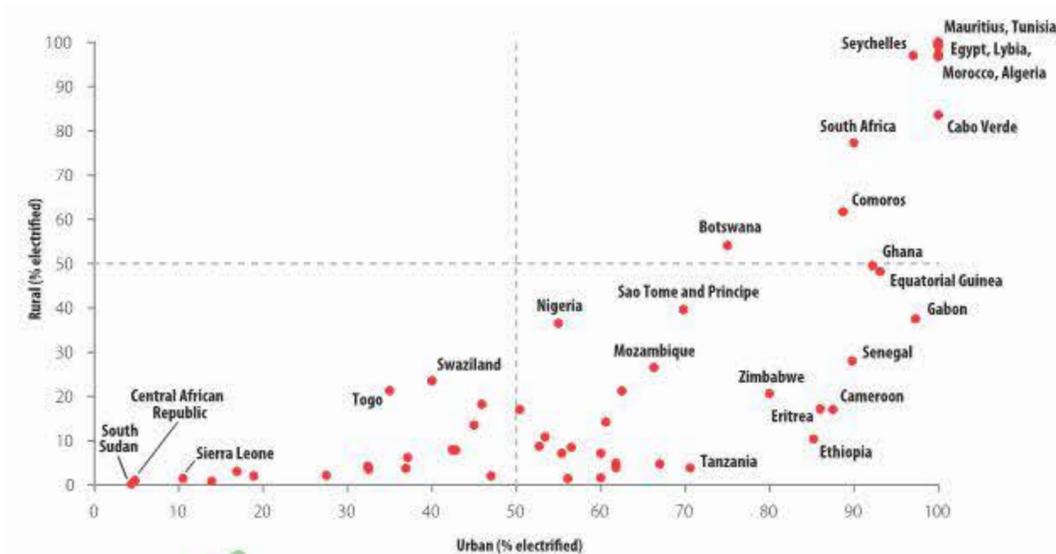


Figure 13. Urban and rural electrification. Rate of connection to the grid in 2013

Source: IEA, World Energy Outlook 2015



PHOTOVOLTAICS AND MOBILE TELEPHONY: DECENTRALISED TECHNOLOGIES SUITABLE FOR RURAL AREAS

Africa – especially sub-Saharan Africa – is lagging behind when it comes to connection to energy and telephone networks, but this could be an advantage enabling it to directly adopt local, adaptable and innovative solutions. The continent could thus become a vanguard in terms of future energy transitions and decentralised services. Mobile telephony is breaking the isolation of rural communities and the development of solar energy will facilitate the diversification of local economies.

• Electricity: major grey areas primarily concern rural populations

Africa is the continent with the lowest electrification rates in the world and access to electricity is an obstacle to its development. But this observation characterises sub-Saharan Africa: while 99% of people in North Africa had mains electricity in 2013, this rate stood at only 32% (634 million people) in sub-Saharan Africa. In eight countries, the rate of access to electricity stands at less than 10%, with particularly critical situations in South Sudan, the Central African Republic and Chad. However, in terms of the number of people without electricity, the greatest challenges are in Nigeria (96 million), Ethiopia (71 million) and DRC (61 million).

Current investments in power grids are not enough to counter the effect of population growth. In recent years, the rate of connection has increased by only 2.3% per year compared

to 2.7% for population growth. Grey areas still exist and the number of people without electricity is increasing. Whatever the country, it is always rural communities that have the lowest levels of access to electricity. In sub-Saharan Africa, the rate of connection for rural populations stands at only 17%, compared to 59% for urban populations. 17 countries even have a rate of connection of less than 5% (South Sudan, the Central African Republic and Chad, as already mentioned, but also Sierra Leone and Burkina Faso). There is an energy divide between urban and rural areas in Africa.

• Africa, a future paragon of photovoltaic energy?

Rural demand for electricity is spatially dispersed and relatively low in terms of power. A rural African person consumes between 165 and 600 kWh per year, compared to around 1 420 kWh for urban dwellers and 6 000 kWh for Europeans. Consequently, catching up is a challenge while rural electrification through connection to the national grid remains complex and costly due to the low population densities still observed in many regions.

However, there is an extensive, abundant energy resource in Africa: solar energy. Sunlight is estimated at between 1 600 and 2 500 kWh/m², which is far more than for any other continent. In order to capitalise on this energy resource, photovoltaic systems (PVS) can now be used to produce electricity in even the most remote regions, and the potential for development is huge.

Through the deployment of off-grid micro-systems and autonomous microgrids, solar energy can play a key role in rural electrification. More and more experiments are being conducted with villages that are fully equipping themselves (Senegal, Mali) and the distribution of domestic photovoltaic kits (Uganda). South Africa and Morocco are the countries that have installed the largest number of PVS in recent years, with the implementation of proactive public policies (including the creation of solar power stations, as in southern Morocco).

But between Morocco and South Africa there is a whole continent and a plethora of energy policies for which "good practice" on solar energy should be shared. Africa's lag in terms of electrification in comparison with the other continents could even be a unique opportunity to adopt a different model, one that is decentralised and sustainable, thereby meeting the needs of millions of rural people while leading the way towards a possible energy transition.

• Mobile telephony: connecting rural people in Africa

Africa has become an Eldorado for mobile phones. While fixed line penetration is very low – at less than 10% on average – mobile phone services are booming. The total number of subscriptions to these services in 2014 was estimated at 920 million, compared to 578 million in 2010, 151 million in 2005 and 15 million in 2000. This spectacular growth is partially biased by competition between operators, which results in multiple individual subscriptions to optimise tariffs.

There are, however, considerable differences between countries and a divide currently exists between the countries of North and Southern Africa, where the number of subscriptions exceeds the number of people, and the other countries of the continent. Some countries in

West and Central Africa nevertheless also have subscription rates of more than 100%. East Africa is less well-connected, but is rapidly catching up.

In rural areas, the development of mobile telephony is facilitating trade between producers and sellers on local markets, access to services (health, transport), the functioning of family networks and population mobility. It is breaking the economic isolation of rural people, but it also has the potential to radically transform rural economies with the development of new, innovative information and advisory services, in particular for agriculture (information on prices, rainfall or farming techniques), and especially of financial services. Mobile phone companies are joining forces with the banking system – or even developing their own financial services – to provide options for credit, payments and transfers, even in isolated areas with highly dispersed populations. In this respect, Africa is a leader, and particularly the countries of East Africa, with the provision of services that have not yet taken off in many OECD countries. This catch up is accompanied by a leap forward in terms of innovation.

Jacques Imbernon