



# Centrale Energies

16 May 2019

ENEIA is an independent strategy consulting company, enabling our customers to take advantage of energy transition opportunities since 2007



STRATEGY, INVESTMENT  
& NEW BUSINESS



INNOVATION &  
TECHNOLOGY



ASSESSMENT, MODELS  
& DATA SCIENCE

### A diverse and multidisciplinary team

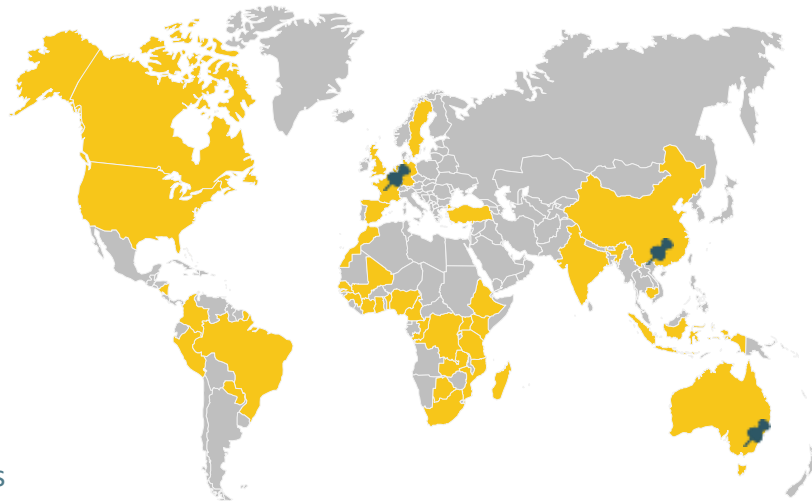


60+ experts  
Strategy, Industry,  
Finance, Technology

### Various customers



Energy companies  
Technology firms  
Financial players & Investors  
Industries  
Institutions  
Start-ups



3 offices  
PARIS – MELBOURNE – HONG KONG

### An international coverage

25+ countries  
200+ clients  
1000+ projects



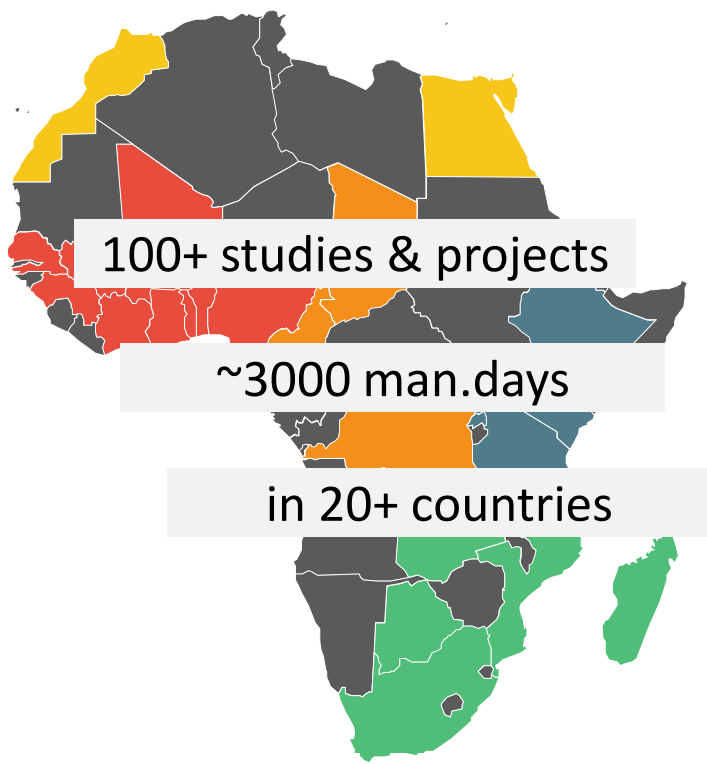
### A unique capital of know-how

Energy production  
New energy uses  
Energy infrastructures  
Environmental and social  
impacts  
Financing





# ENE has worked on off-grid energy in Africa with a wide range of actors, from start-ups to leading energy investors



Energy firms and industrial companies

International institutions & donors

Public and private investors

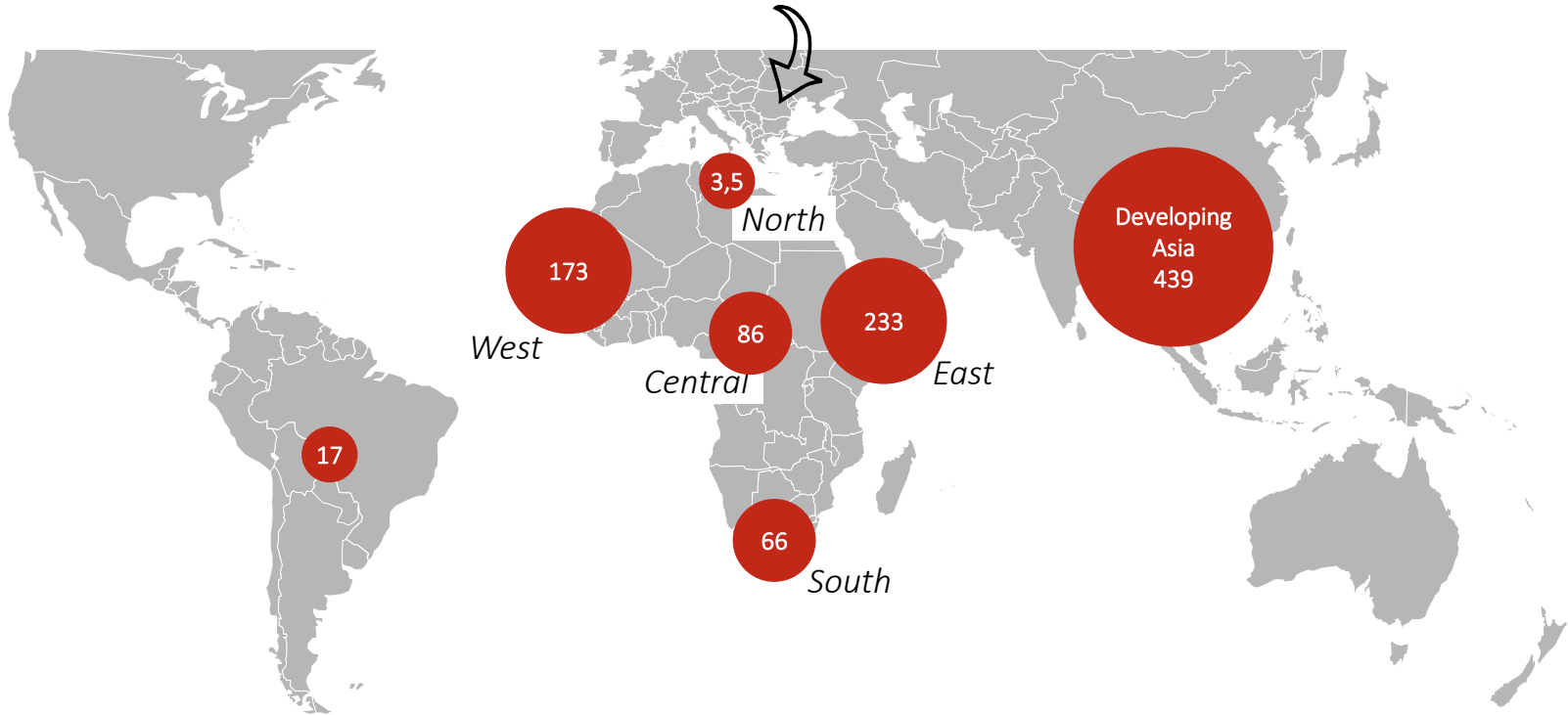
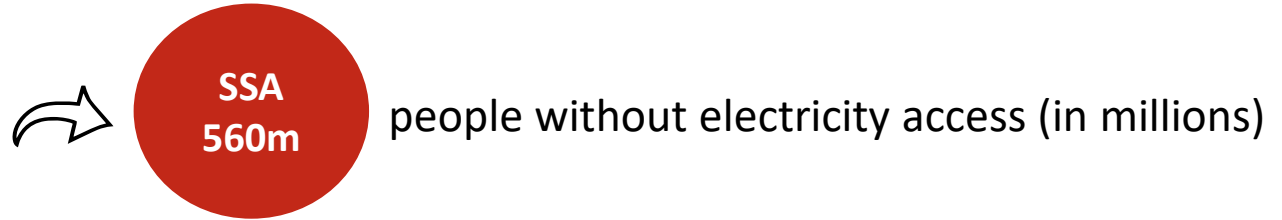
Social entrepreneurs and start-ups



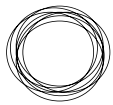


# 1.1bn people live without access to the electricity grid, with 50% of these people in sub-Saharan Africa

Sub-Saharan Africa has the largest population without electricity access



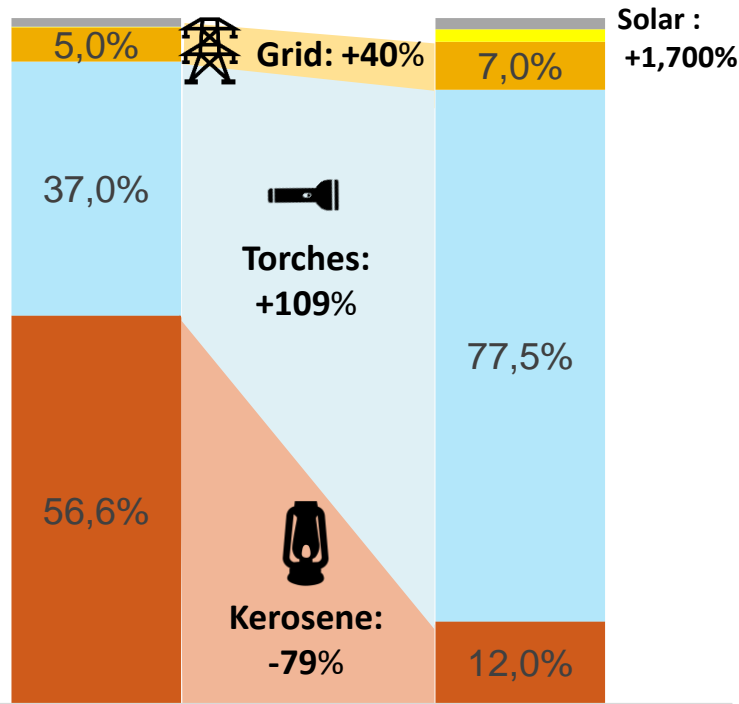
SSA represents 50%+ of off-grid populations, and this % is growing



# In many rural areas, households now use battery torches in rural Africa, a shift from kerosene lamps

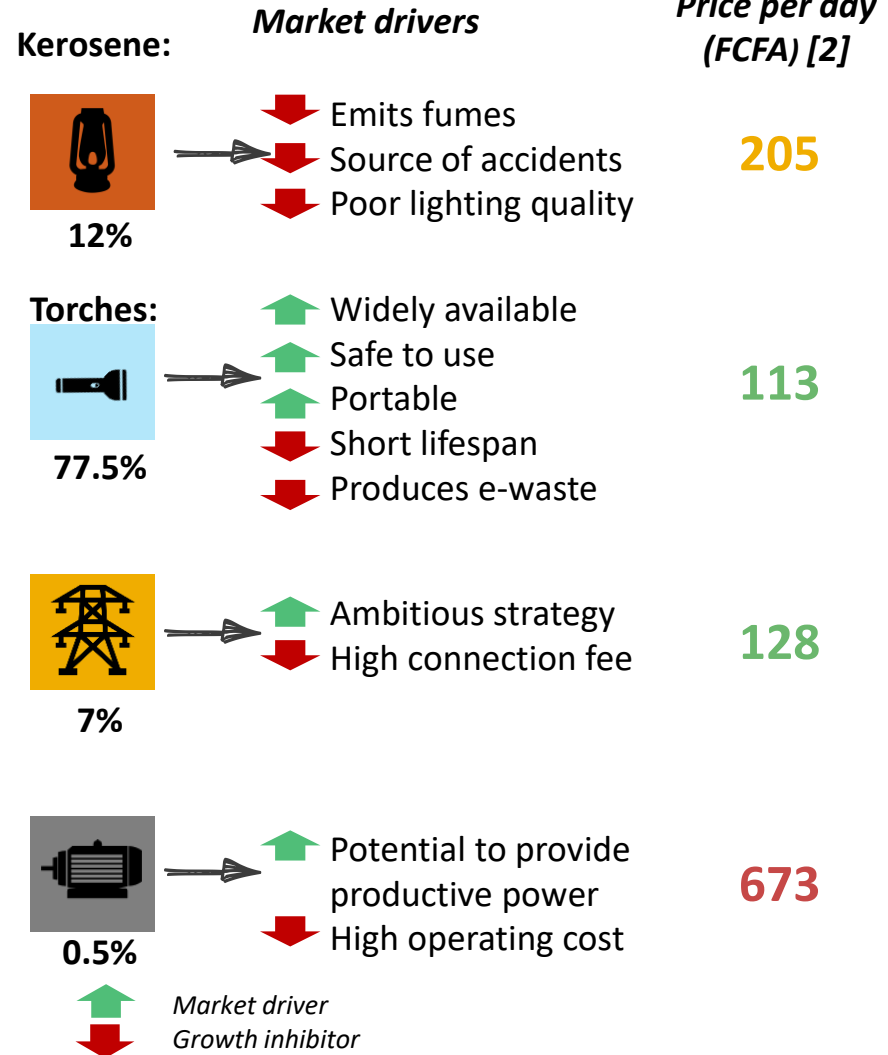
## Togo case study

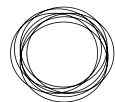
Evolution of lighting sources in rural Togo (2011-2015) [1]



2011 2015

■ Kerosene lamps 
 ■ Battery torches  
■ Grid 
 ■ Solar  
■ Others





# There are three main ways to achieve universal access to modern electricity services

Grid extension

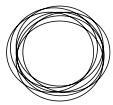


Solar home systems + solar kiosks



Mini-grids

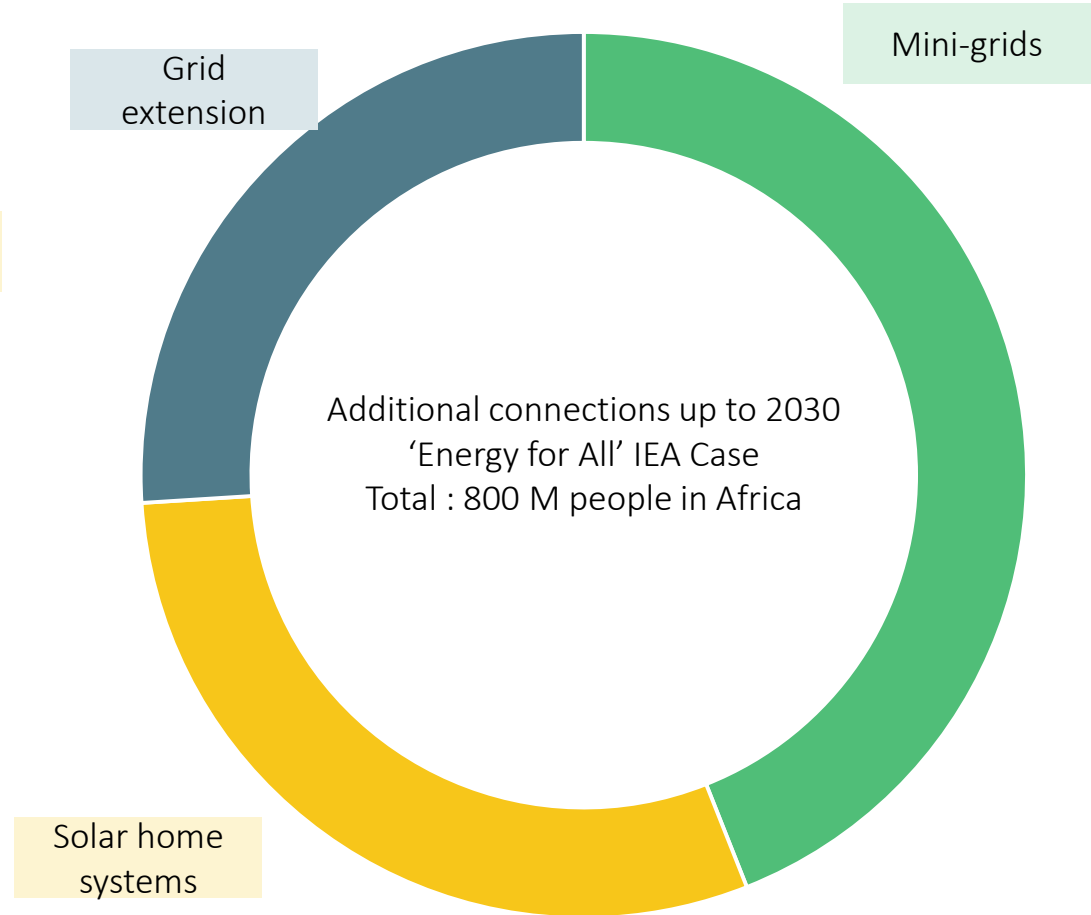
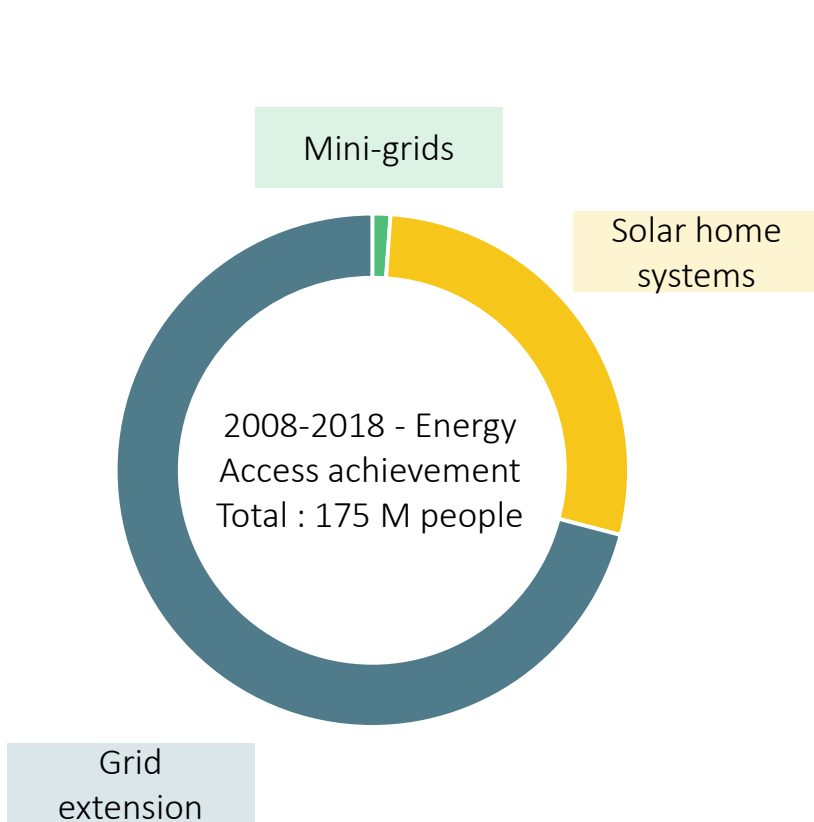


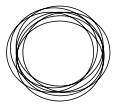


# Though 175m people have been connected in the last 10 years, over the next 12 years, 800m more people need to be connected

From 2008-2018, 175m received access to modern energy services in Africa

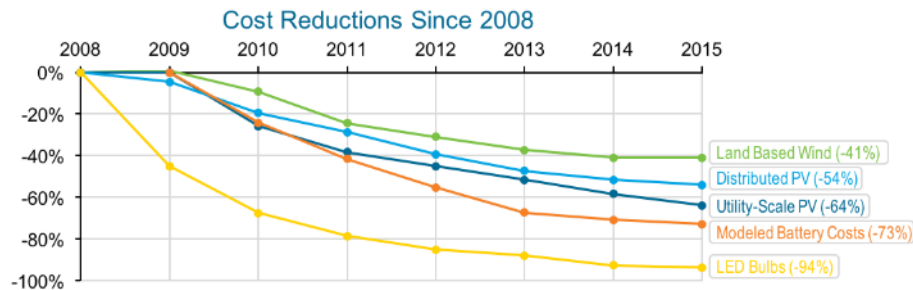
However, to reach the goal of universal electrification by 2030, 800m more people need to be connected world wide





# Solar home systems companies have benefited from the confluence of several technology ruptures

Sharp cost reductions in renewable energy equipment...



...along with a mobile revolution in Africa

395m

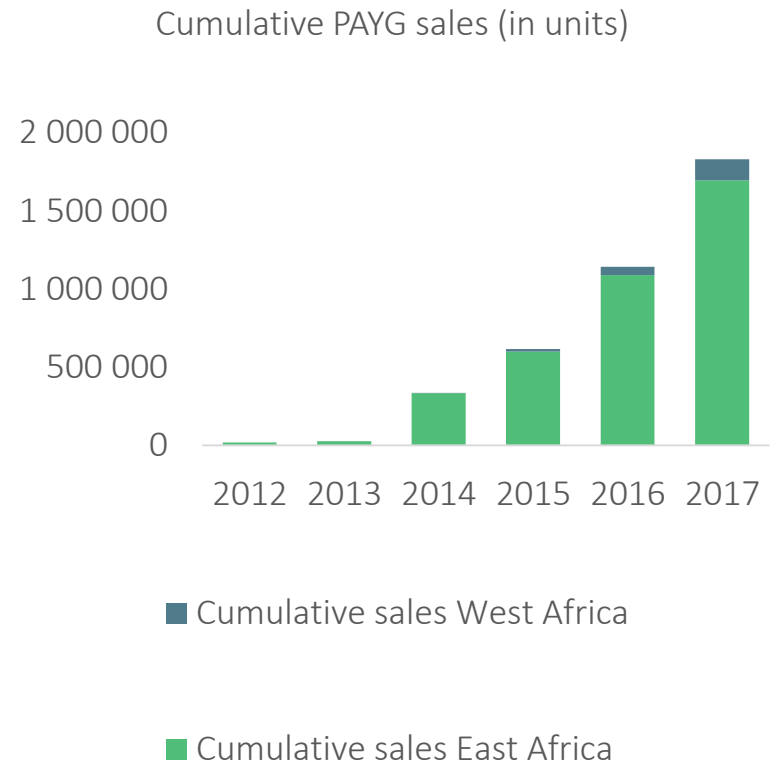
Mobile money accounts in 2018

\$1,5bn

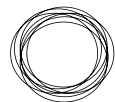
Transactions through mobile in 2018



...has led to a sharp increase in solar home systems, particularly under a pay-as-you-go model

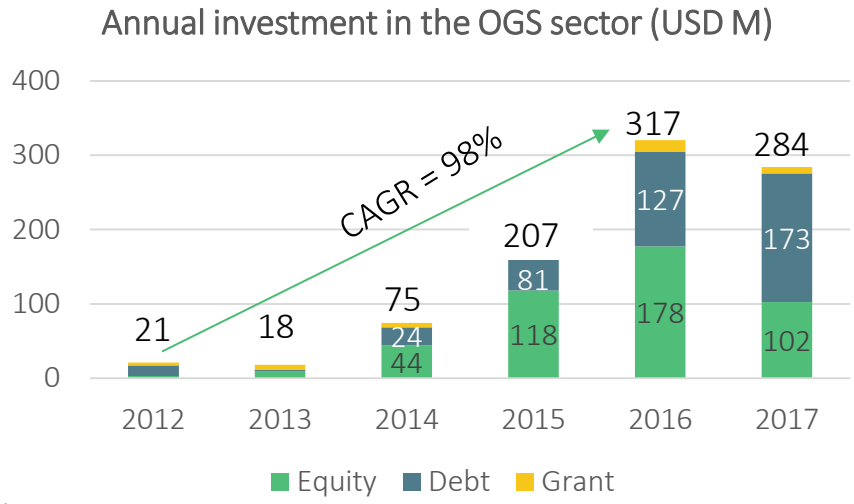






# These pay-as-you-go companies have also benefited from significant investment, increasingly from private capital

The off-grid sector funding has experienced an average growth of +98% between 2012 and 2016



...but private investors have begun to invest in the market on a commercial basis

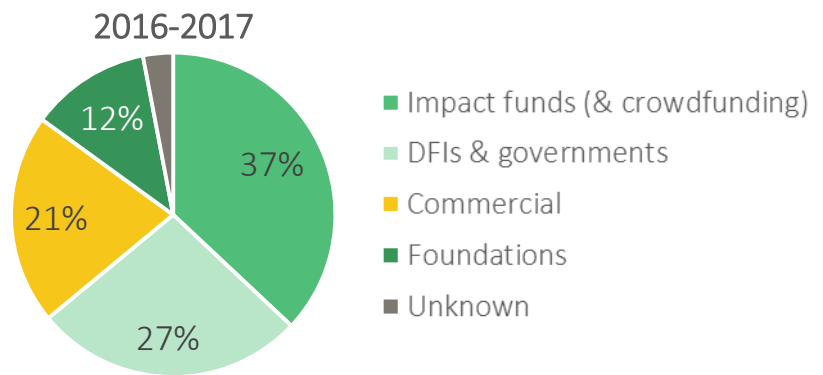


ENGIE and EDF have all made major investors in the sector,

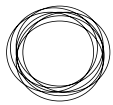


Financial investors, such as infrastructure and PE funds, also see interesting portfolio diversification strategies from investing in off-grid, as well as an opportunity to learn about the market.

76% of the funds still come from social investors...



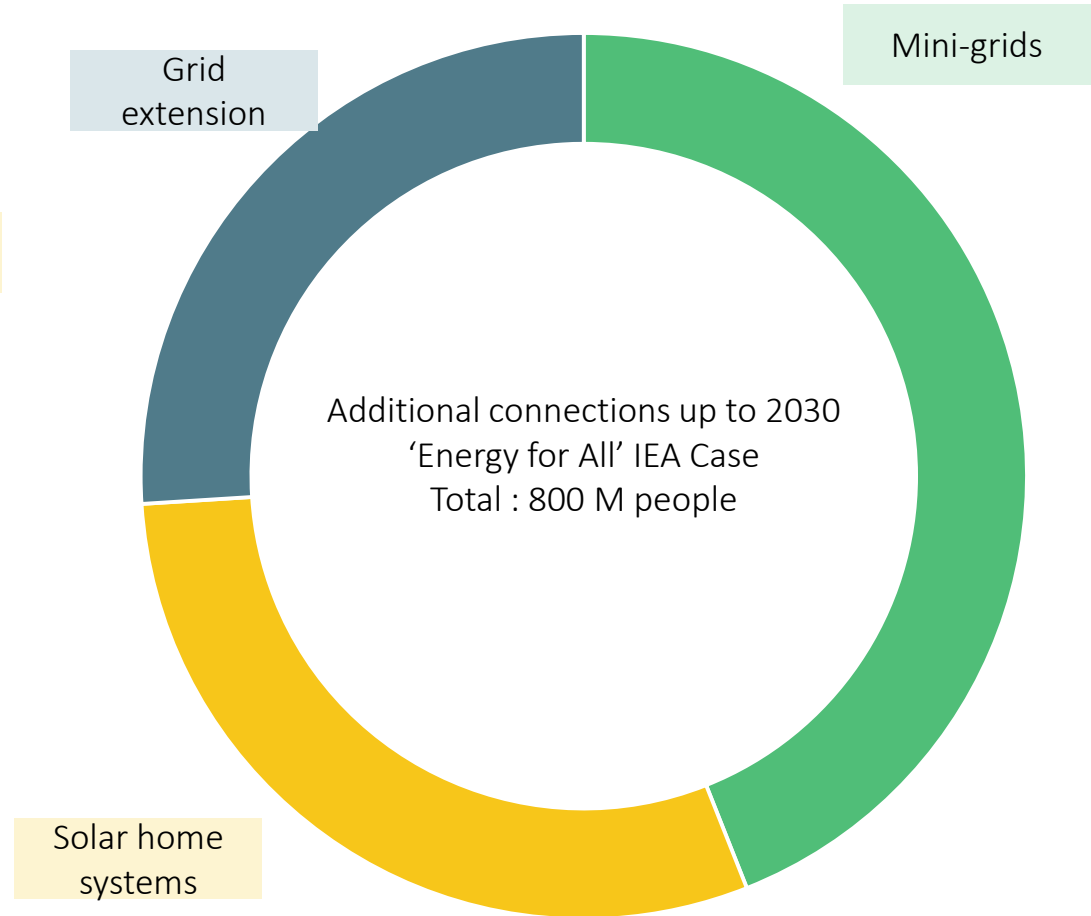
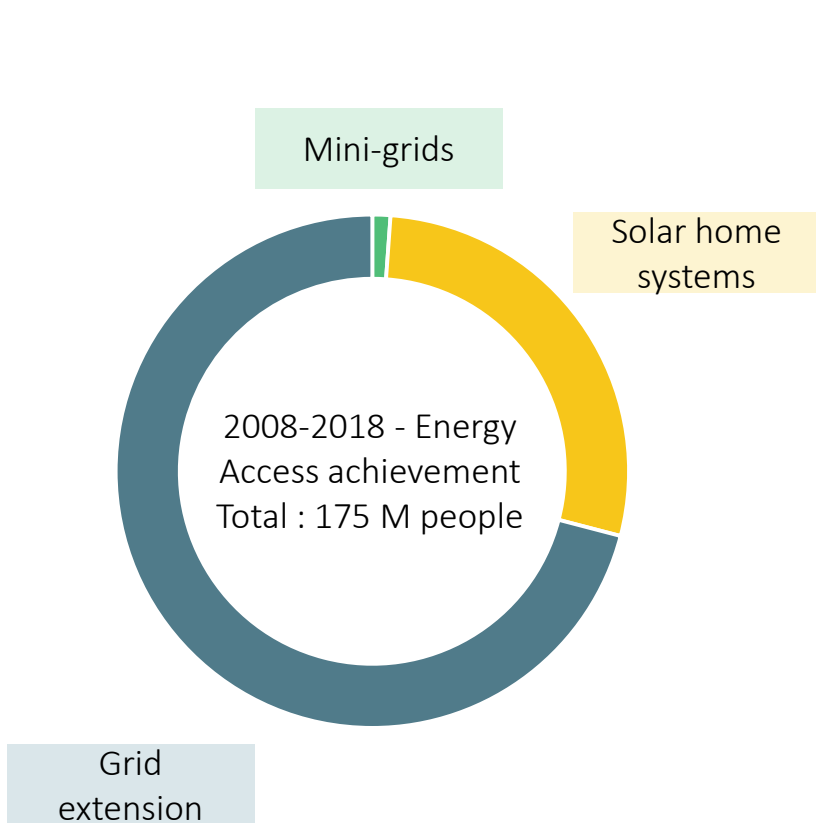




As can be seen, mini-grids are expected to take up a large % of future connections, but to date has been relatively small.

From 2008-2018, 175m received access to modern energy services in Africa

However, to reach the goal of universal electrification by 2030, 800m more people need to be connected world wide

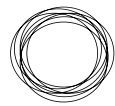


Source: IRENA, IEA









Mini-grids have faced several challenges both on the business model, and on regulation

## 1. Business model challenges

- ▶ Revenues are low from poor households (\$4-5 per month)
- ▶ Tariffs are often standardised
- ▶ CAPEX needs to be spent at once
- ▶ OPEX always is higher than expected

## 2. Regulatory problems

- ▶ Arrival of the grid is always a challenge
- ▶ Gaining permits is also a difficulty
- ▶ Tariff negotiations can take time

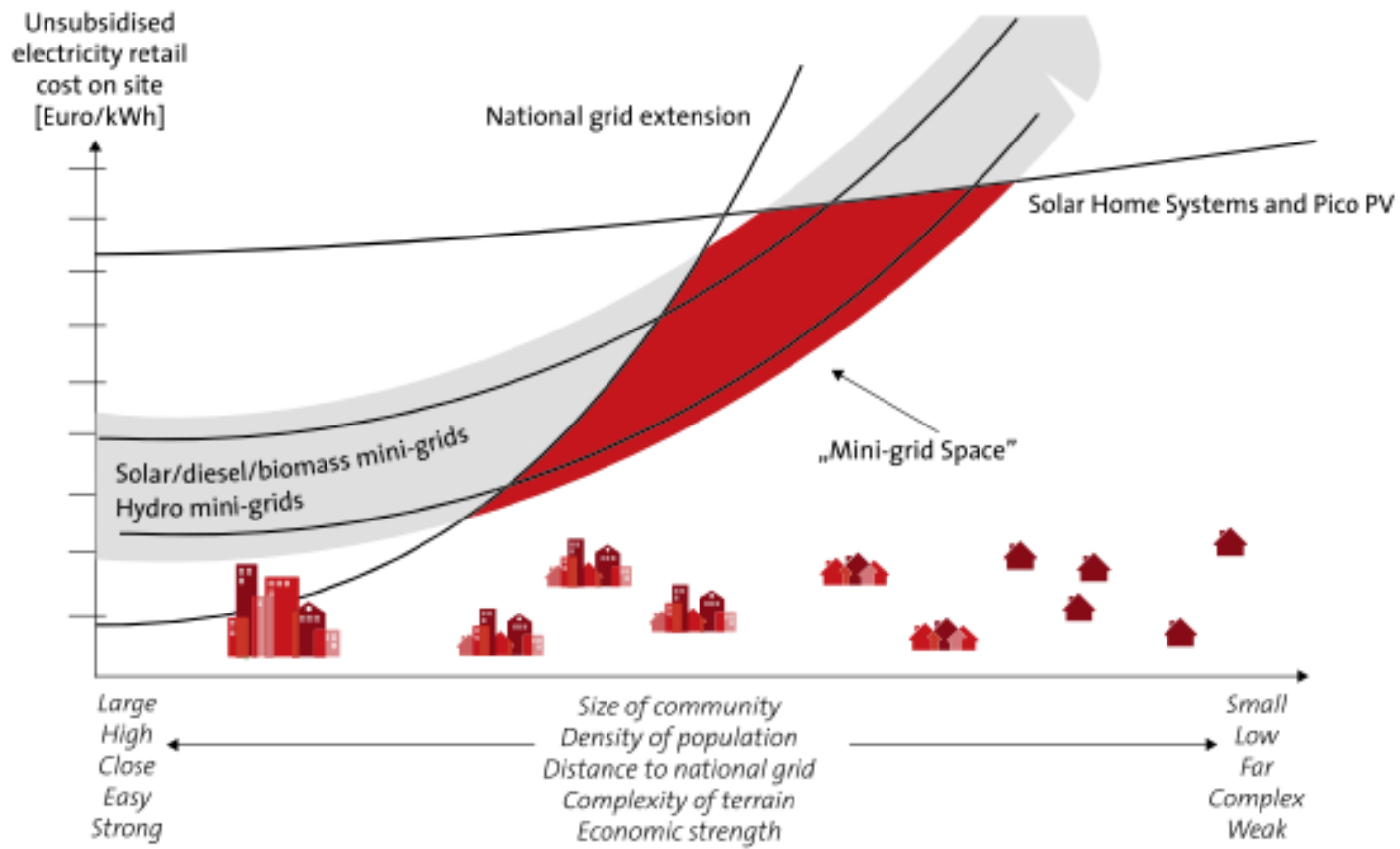


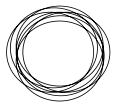
The main reason is the lack of commercial viability for mini-grids, and the lack of the same public financial support

	Grid connection	Mini-grid DESCOs	SHS
Commercially viable in rural areas when distant from grid?	Rarely	Rarely	Yes, though not for high power levels or for universal coverage
	+		
Receives public financial support?	Yes, national and international funds	Only low levels, though new funding emerging	Limited amount, but were supported with impact finance
	=	=	=
Sector growth	High, 25m connections 2012-2015	Low. <25,000 connections	Yes, 2m+ connections under PAYGO model
Allows for productive use?	Yes	Yes	No (unless high cost system)

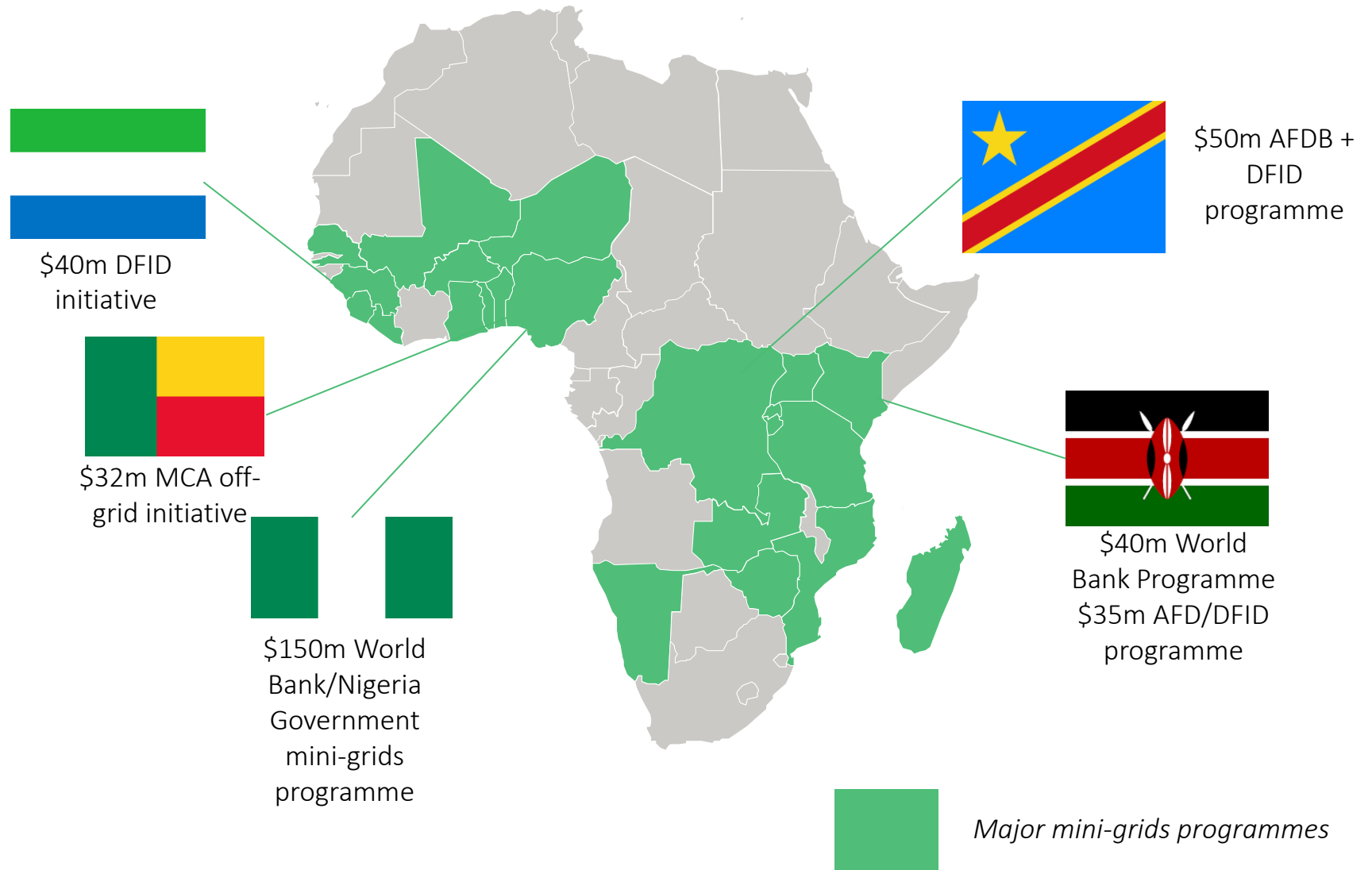


There is likely to be a space where mini-grids are the most appropriate form of electrification





# Ambitious programmes across Africa, so we are likely to see growth throughout the continent







Questions?