Sustainable Energy in Africa

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IEA RIAB Special Session
Africa's renewable energy transition: What does it take?

Rome October 24th 2018

Macrotrends

Key dynamics in Africa

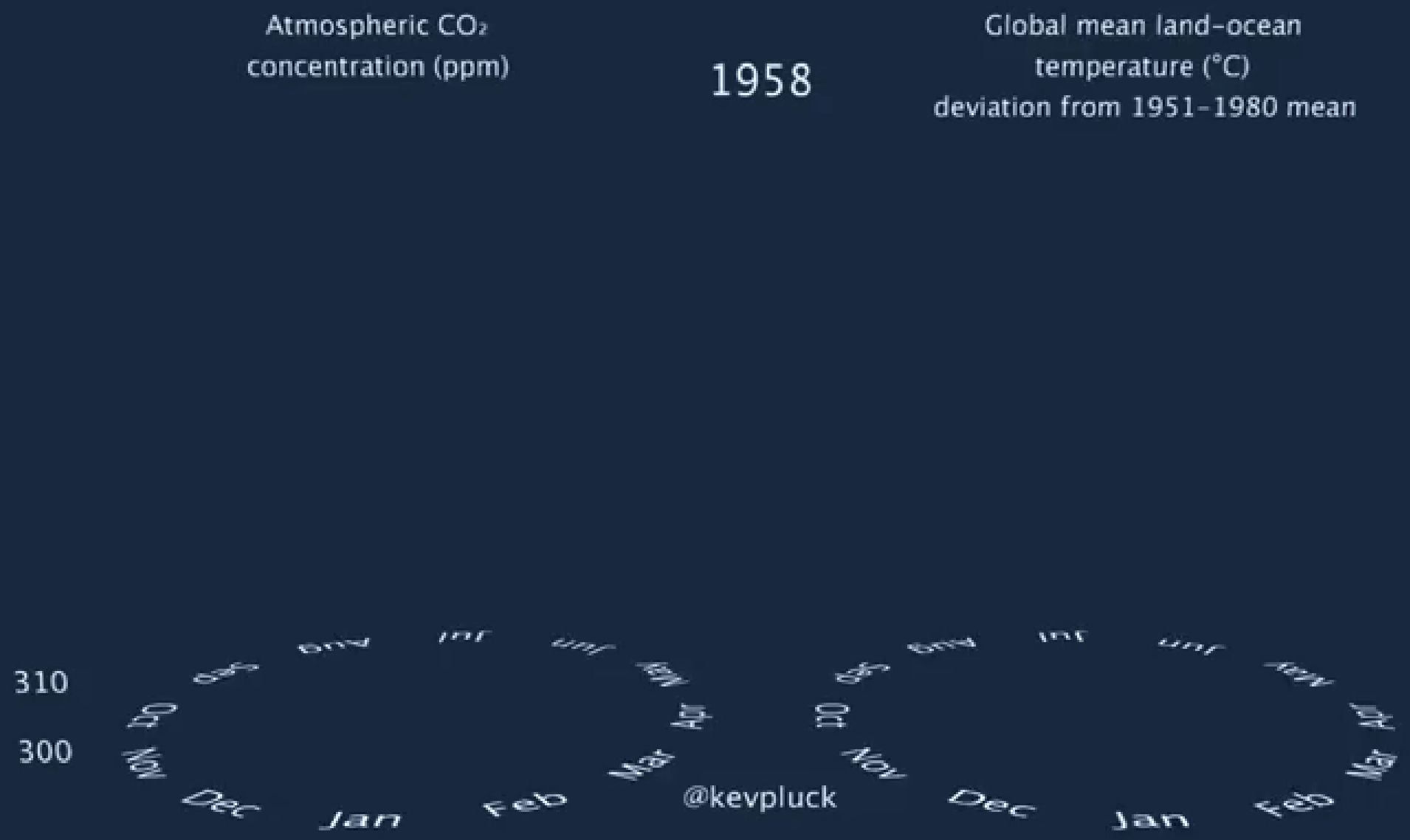
Climate Change

Population Growth

Urbanization

Demand Growth

Macrotrends – Climate Change

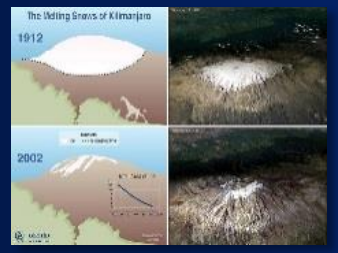


GISS Surface Temperature Analysis (GISTEMP). NASA Goddard Institute for Space Studies.
Scripps CO_2 Program 2017

Macrotrends – Climate Change

Africa: the most vulnerable continent to climate change effects

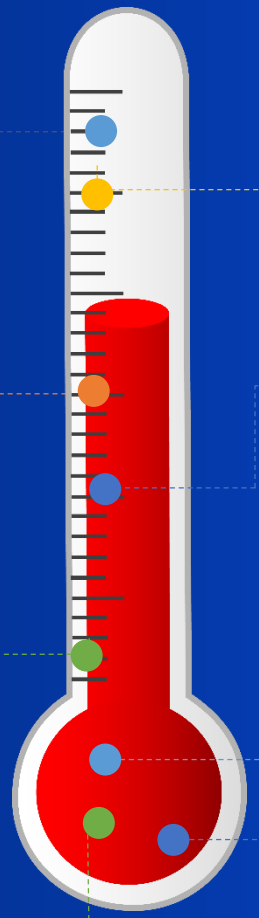
IMPACTS ON WEATHER PATTERNS



IMPACTS ON WATER SUPPLY AND QUALITY

IMPACTS ON AGRICULTURE AND FOOD

IMPACTS ON ECOSYSTEMS



IMPACTS ON HUMAN HEALTH

IMPACTS ON SHELTER

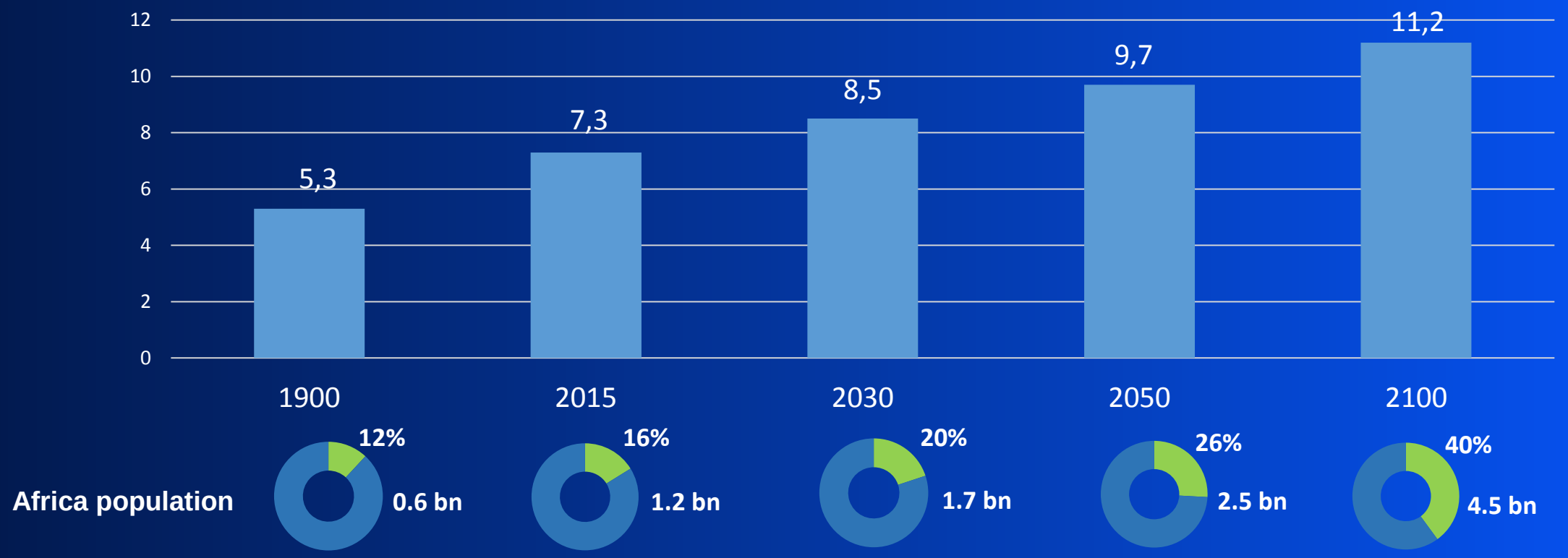
IMPACTS ON VULNERABLE POPULATION

IMPACTS ON NATIONAL SECURITY

Macrotrends – Population Growth

Africa: the Fastest Growing Continent

World Population Evolution (bn)



More than half of global population growth between now and 2050 is expected to occur in Africa

Source: United Nations – Population Division

Source: Unequal Scenes by Johnny Miller

Nairobi

Source: Unequal Scenes by Johnny Miller

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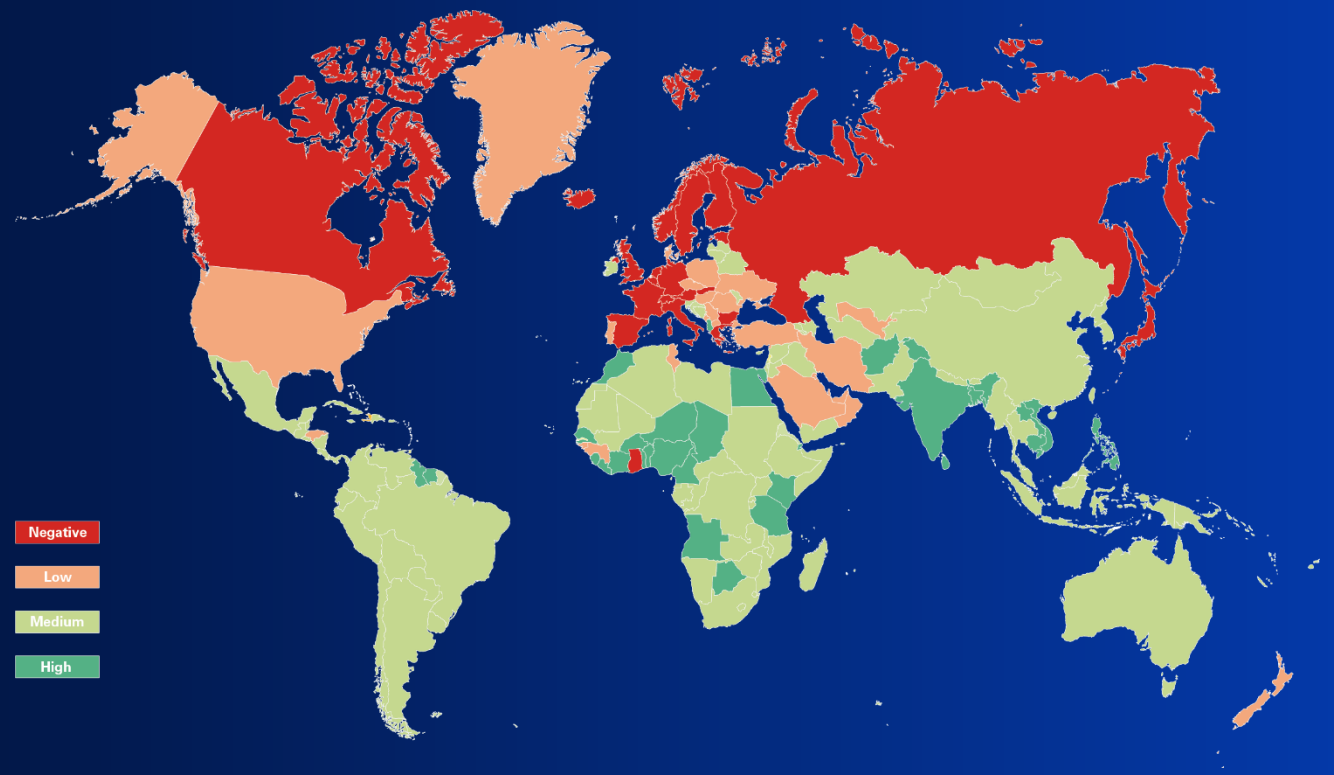
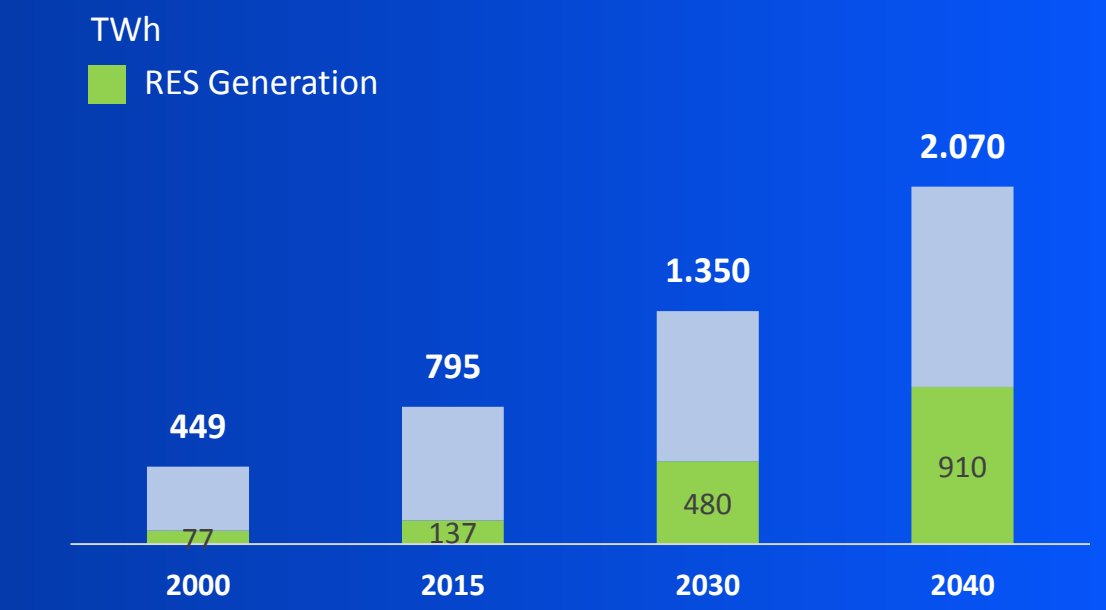
Macrotrends – Demand Growth

Electricity Demand Expected to Double by 2030



Africa Forecasted Electricity Demand Growth



Pro capita Demand TWh/year

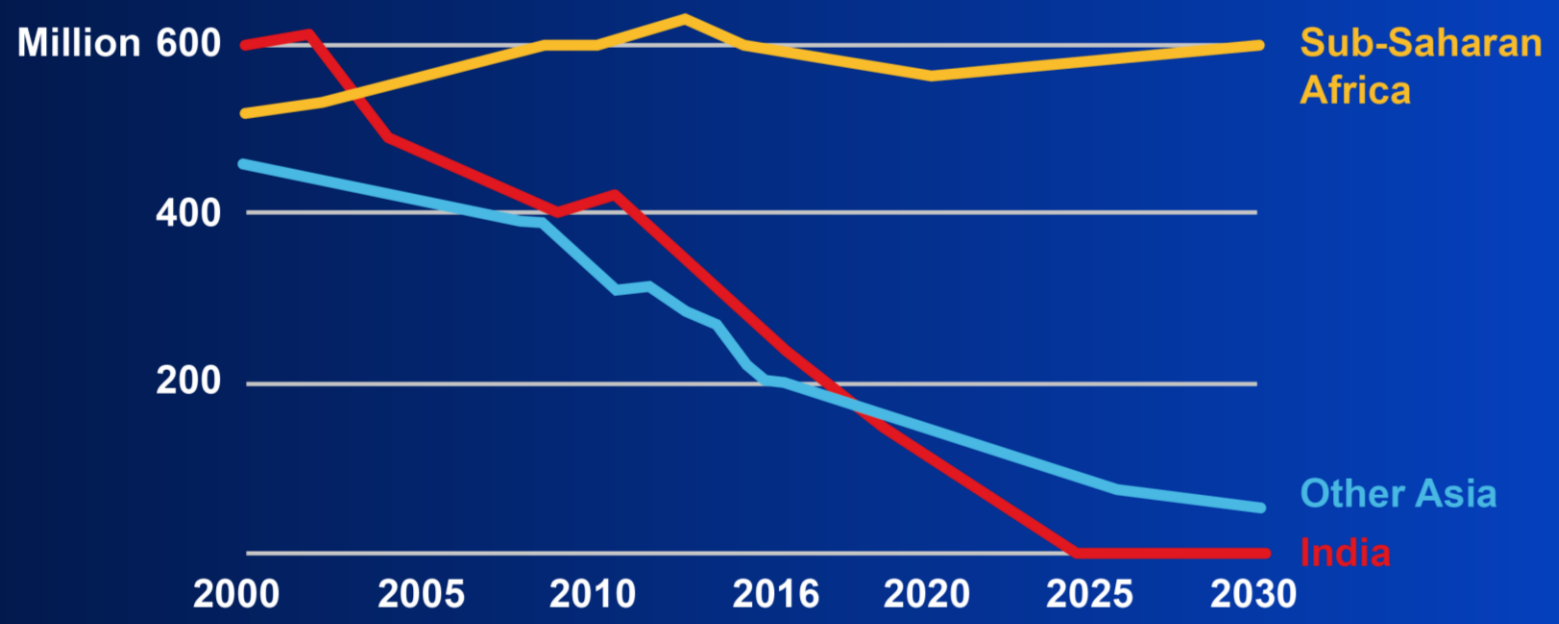
2000	2015	2030	2040
0,5	*0,7*	*0,8*	*1,0*

Source: IEA – WEO 2017, New Policies Scenario; United Nations – Population Division; EGP Analysis

Access to Electricity

Africa: the Fastest Growing Continent

Population without access to electricity in SSA 2000-2030



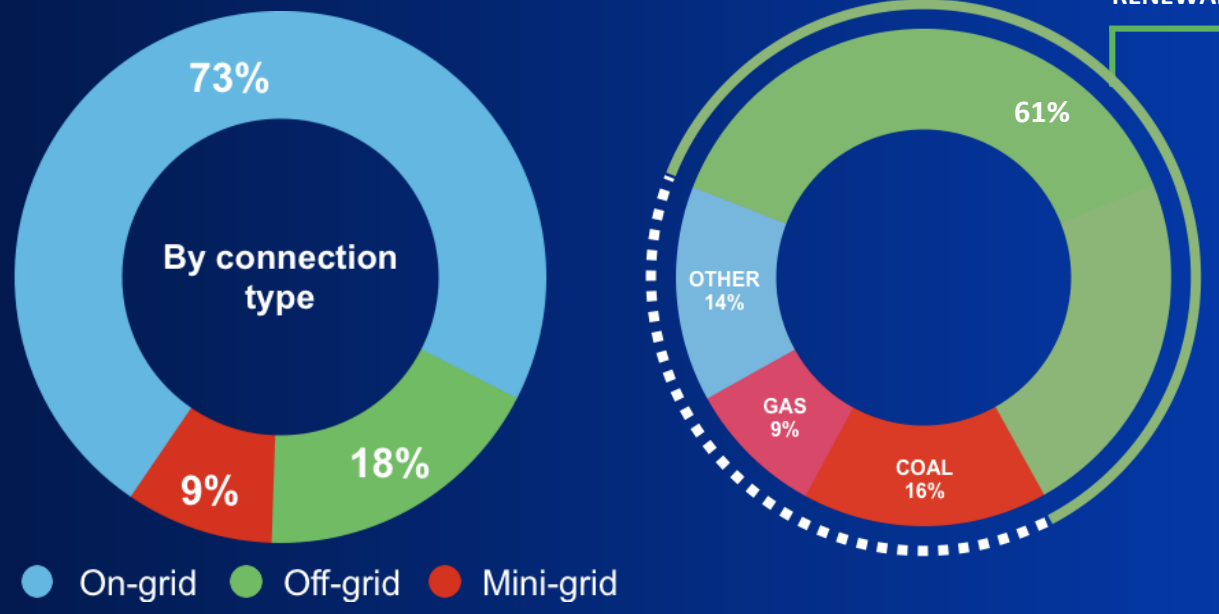
Population growth in sub-Saharan Africa will exceed electrification efforts: **more people will lack access in 2030 than today**

Source: IEA WEO 2017

Access to Electricity

Renewables as the main pathway to gain access

Electricity access by connection type and source 2017-2030[1]



Available tools to address the electricity access

- **Individual solar-power devices**, especially for lighting, and small-scale home

- **Mini-grids** in rural areas

- Access to **electricity from the grid**

Multiplier effect on health care, education, and economic opportunities

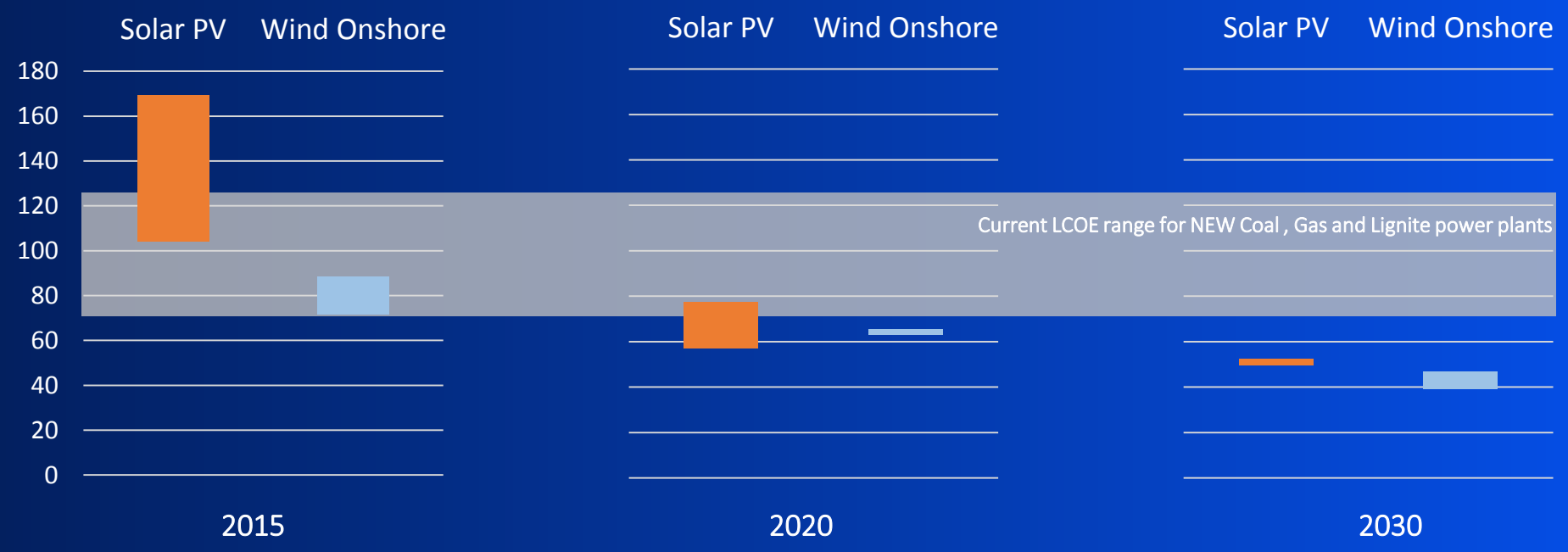
(1) Energy Access Outlook 2017 – New Policies Scenario

Source: IEA WEO 2017

Cheap Energy

Competition Among Technologies

Average LCOE €cent/kWh - Africa



Africa can leapfrog to renewable energy as the main path for an equal and sustainable energy future

Source: IHS, UBS, BNEF

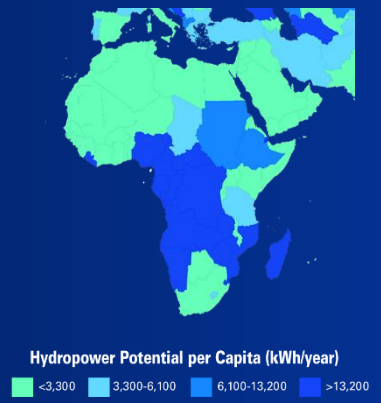
Spread and Fast Energy

Resource availability and Fast Time to construction

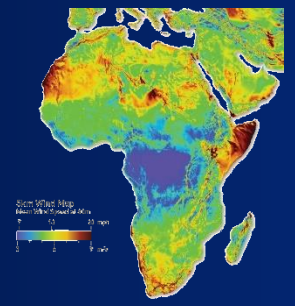
Resource availability

Geothermal

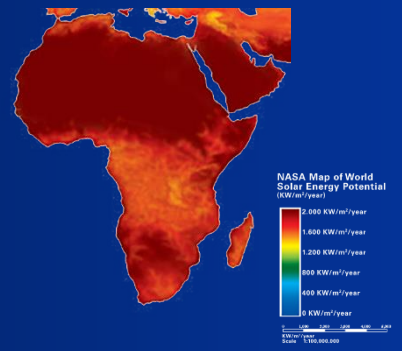
Hydro



Wind



Solar



Time to construction by source

PV & Wind
8 ÷ 12 months

CCGT
16 ÷ 20 months (open cycle)
26 ÷ 30 months (closed cycle)

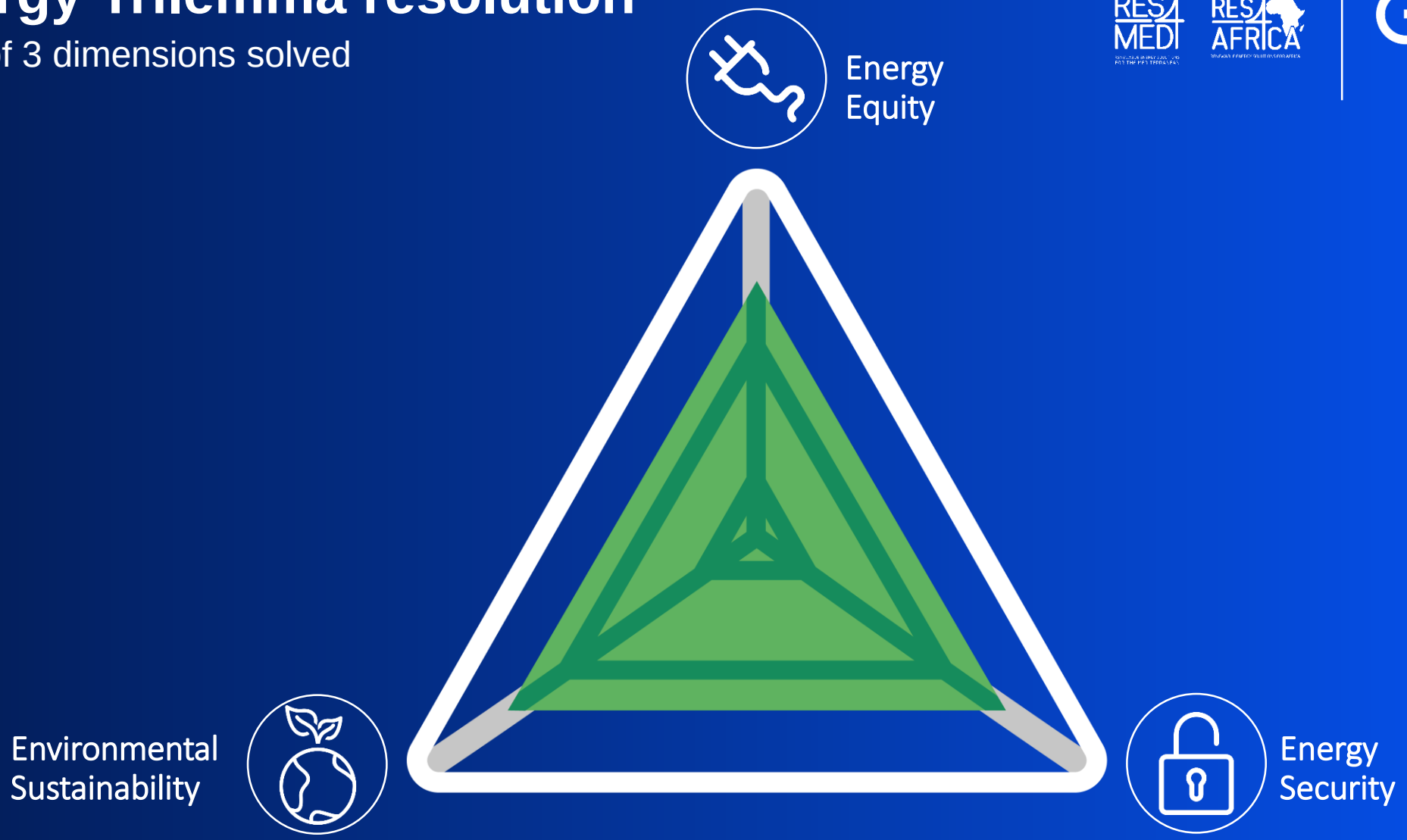
Coal
40 ÷ 60 months

Nuclear
120+ months

RES have a shorter construction time, and offer a **fast and flexible response to growing demand**

Energy Trilemma resolution

2 out of 3 dimensions solved



SDGs impact on renewable projects

Methara project example

Metehara project

The Metehara project can be expected to significantly contribute to 10 out of 17 Sustainable Development Goals on the Government path toward a sustainable economic growth, characterized by a higher level of shared prosperity, social inclusion and employment.

PROJECT SPECIFICATIONS

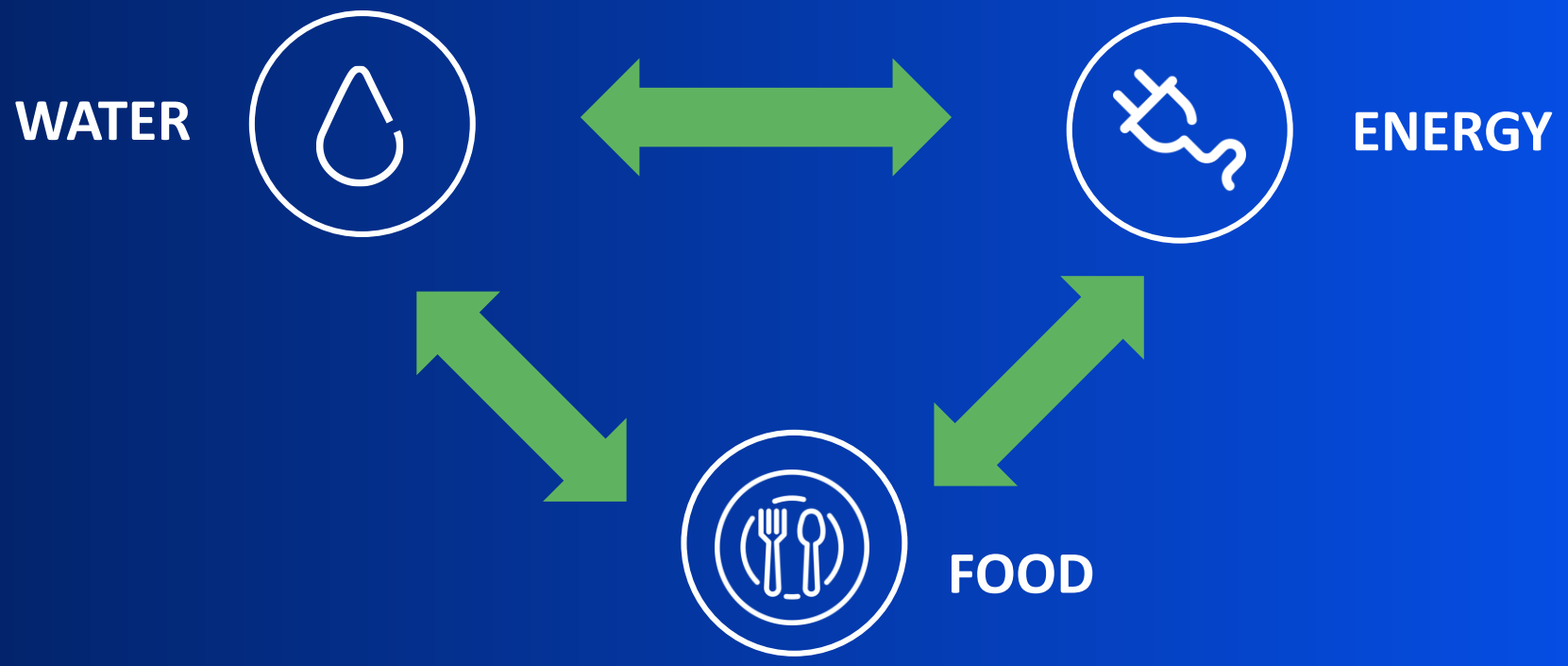
- Typology: Solar power plant
- Power: 280 GWh per year
- Capacity: 100 MW

$ 258 M	Increase in income of the poor
$ 130 M	Increase in food consumptions of the poor
$ 1,6 M	Increase in health expenditure of the poor
7.130 U	Additional yearly number of children in primary education
20.121 U	Number of women improving quality of life
$ 7.7 M	Increase in water consumption of the poor

40.185 U	Additional number of persons using clean energy
8.409 U	Additional permanent jobs
CO_2 27.197 T	Avoided emissions based on country's mix
39 %	Share of increase in income of the poor over project income
65 %	Households' increased consumption / increased total production

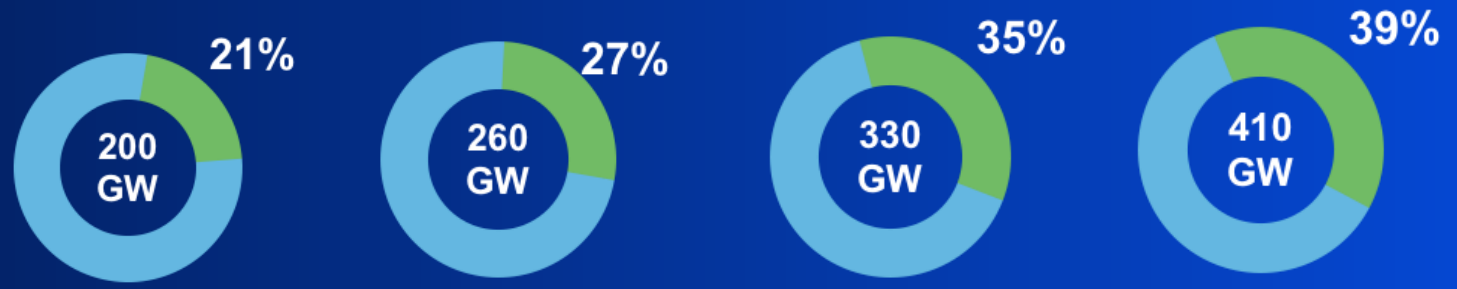
Water-Food Energy Nexus

Environmental sustainability - Nexus



Renewable Evolution in Africa

Cumulative Installed Capacity – GW



	2017	2020	2025	2030
GW	42	70	115	160

	2017	2020	2025	2030
Geothermal	1	2	5	5
Bioenergy	2	2	5	5
Solar	4	15	30	55
Wind Onshore	5	10	20	35
Hydro	31	40	55	60
RES Totale	42	70	115	160

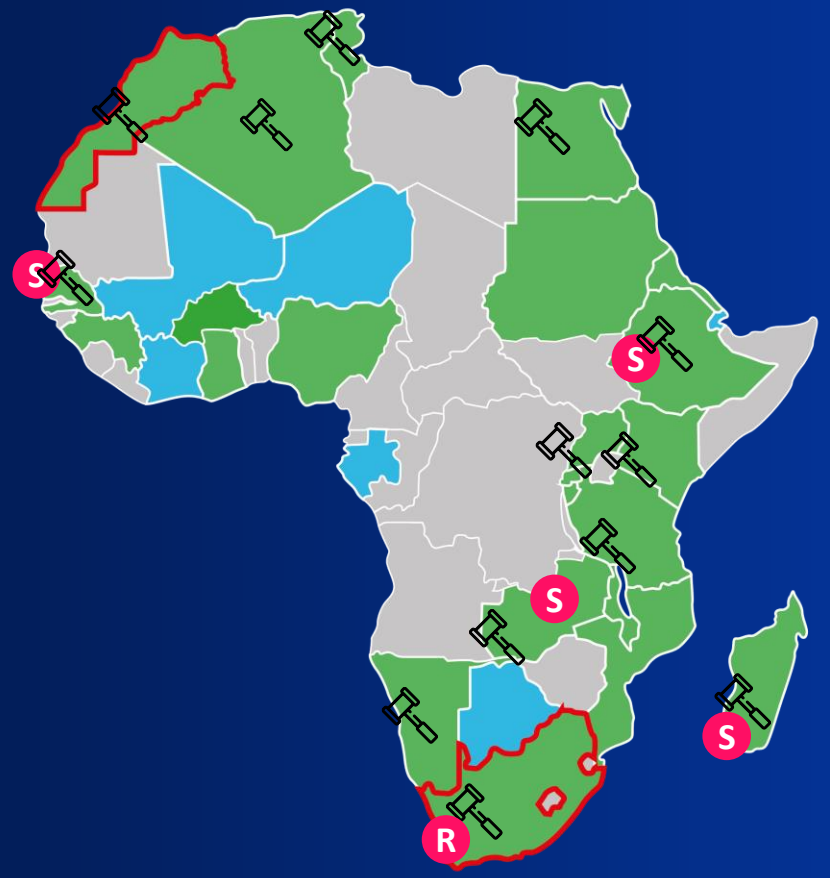
CAGR 17-30	
Hydro	5%
Wind Onshore	17%
Solar	23%
Bioenergy	10%
Geothermal	14%
Totale RES	11%

2030 RS Market Share
3%
3%
34%
23%
37%

RES Capacity: EGP estimate based on external info provider
No RES Capacity: Enerdata
Pump capacity not included

Renewable Regulations in place in Africa

RES support schemes



Over 20 countries adopted dedicated regulation for RES Development

mainly through tenders and the IFC's Scaling Solar program

- C&I PPA market
- RES Target and support mechanisms (existing or announced)
- RES Target but NO support mechanisms
- S Scaling Solar
- R REIPPPP
- Auctions

Scaling-up Renewables in Africa

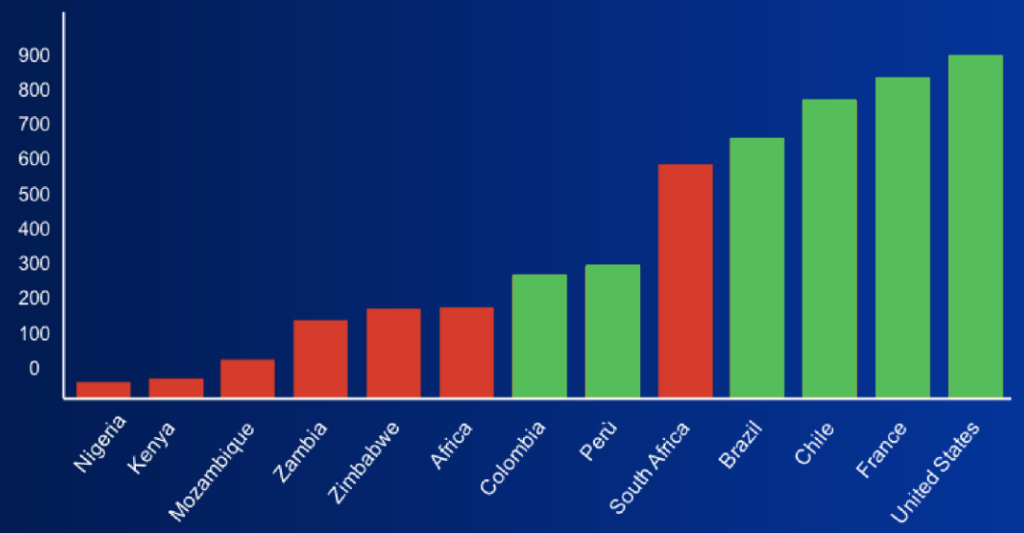
What is needed

	Enabler	Benefit for the Country	Industrial Prospective
1	Grid & Infrastructure	Follow up with the Megacities trend	Large Scale Investment Opportunities
2	Planning & Execution	Improving time to market and promptly meet the energy demand increase	Reliable Timeframe for Investment Decision

1 What is needed

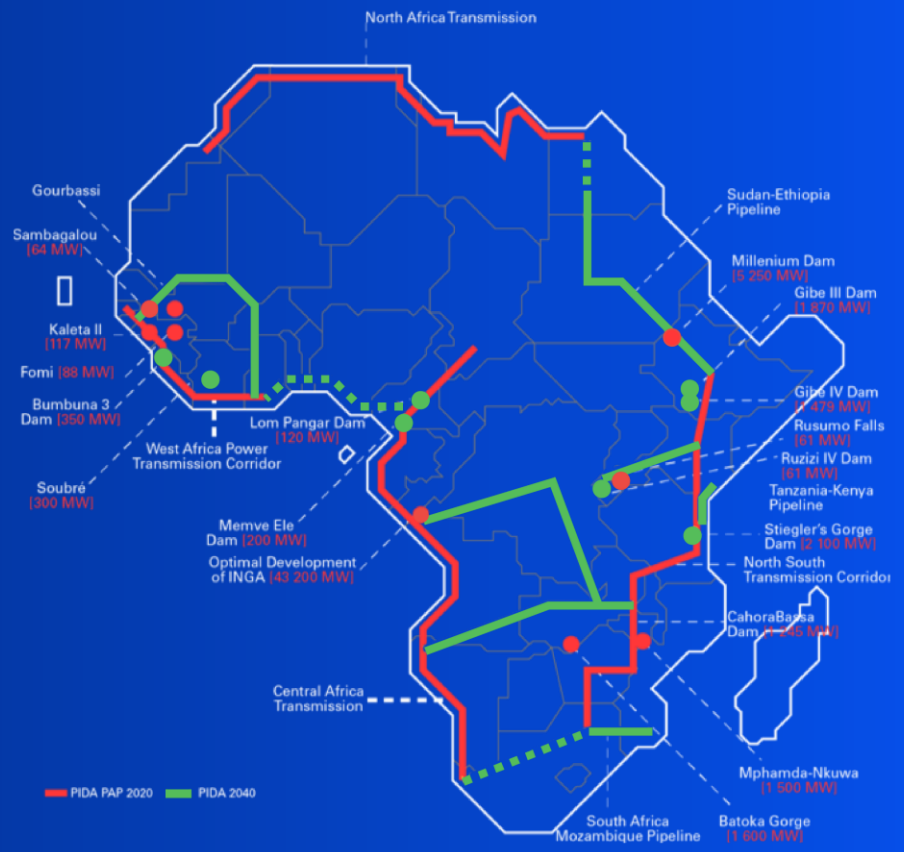
Grid & Infrastructure

Transmission lines per capita (km/Milion people)



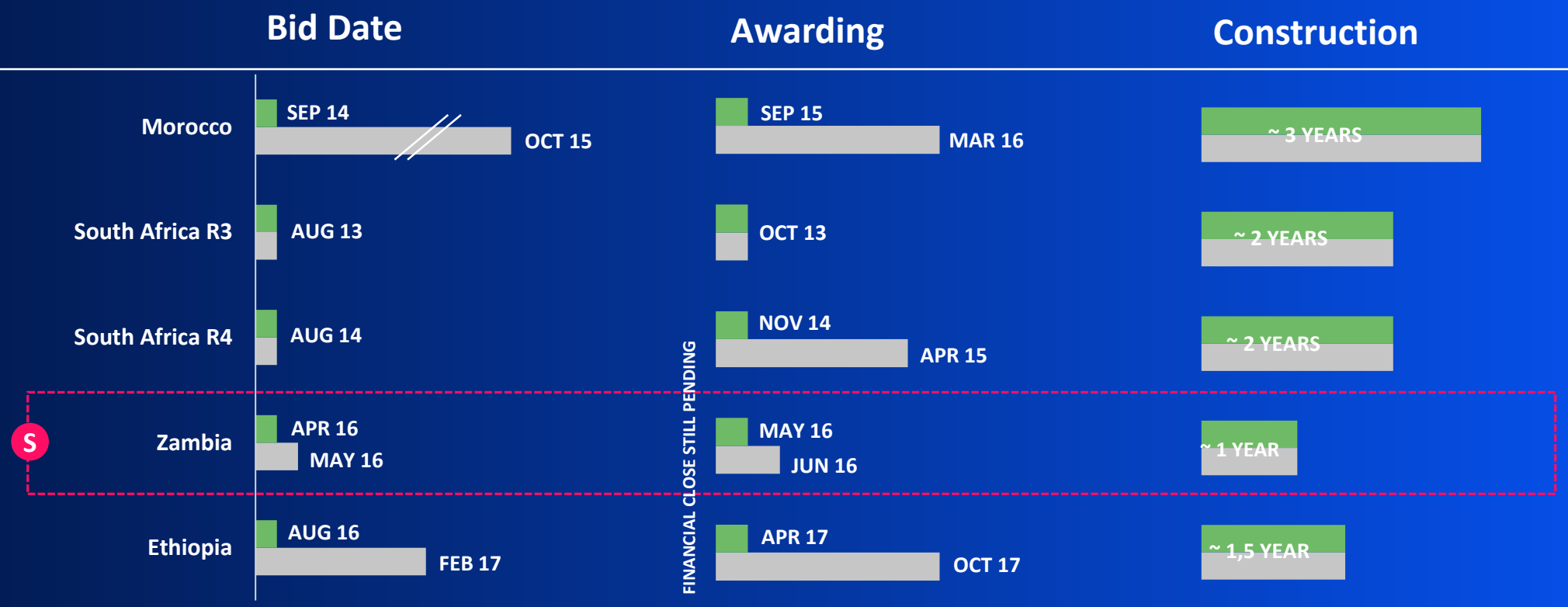
Independent power transmissions are the most broadly applicable business model for increasing privately financed transmission in Africa

Major transmission projects in Africa



2 What is needed

Planning and Execution issues



Time to market is the critical issue
to be addressed to boost RES development in Africa

Scheduled Date

Actual Date

RES4Med – RES4Africa

Role

Renewable Energy Solutions for Africa - RES4Africa - aims at creating **an enabling environment for RE investments** through **3 strategic work streams:**

Acting as a connecting platform for **dialogue & strategic partnerships**

Providing **technical support & market intelligence**

Leading **capacity building** & training efforts based on members' expertise