2030 - 300GW

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Initiative Africaine pour les Énergies Renouvelables

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Digitalisation for renewable energy – setting the scene

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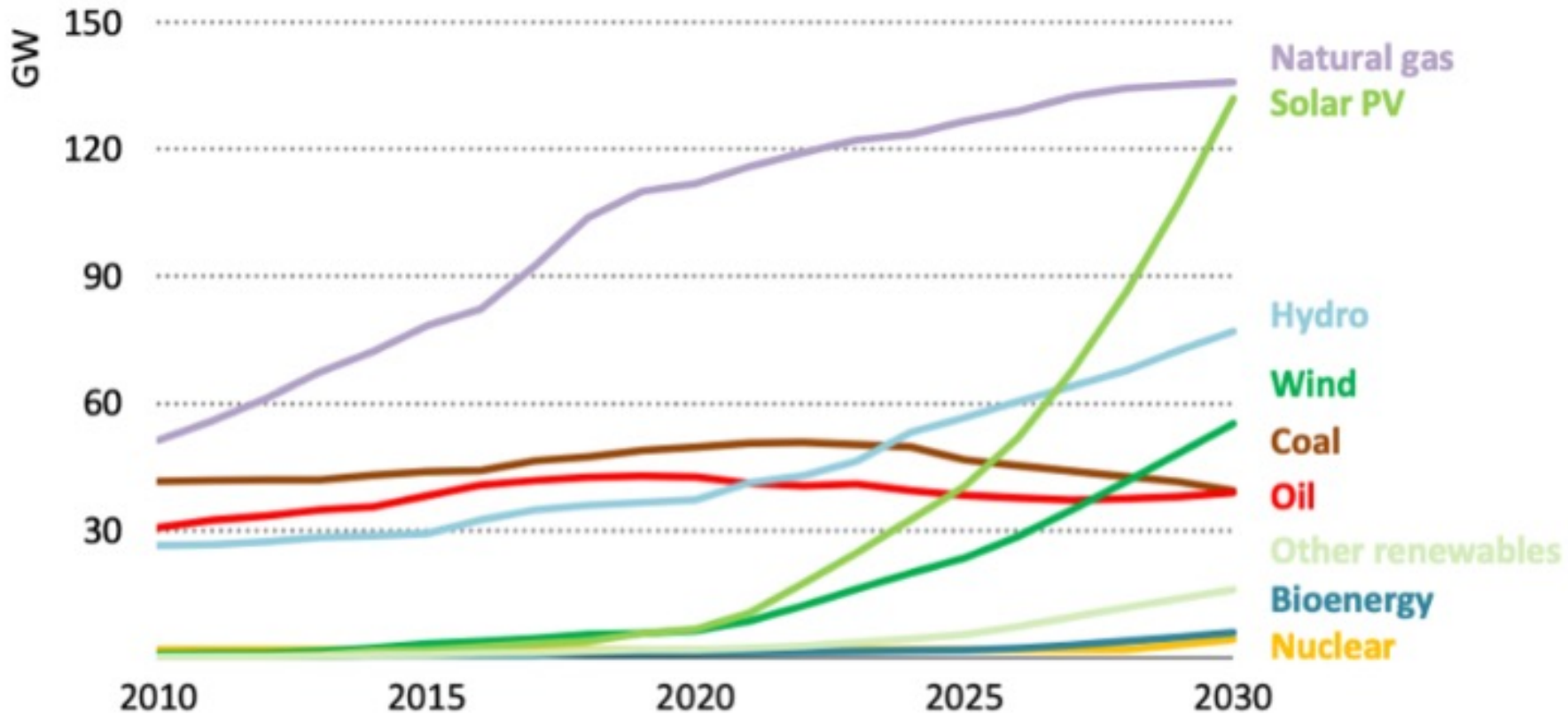
A massive shift towards solar PV

Installed power generation capacity by source in Sustainable Africa Scenario (SAS)



People gaining access to electricity by technology by 2030 in Africa in the SAS

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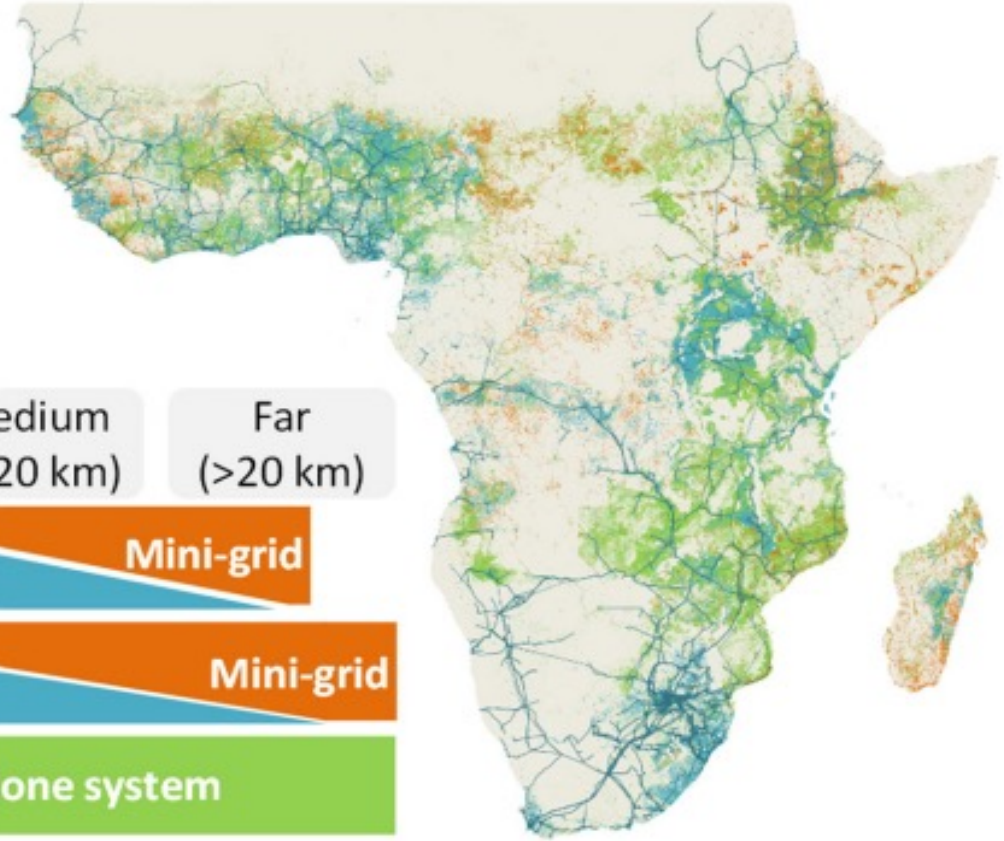
Grid
Mini-grid
Stand-alone system
Existing grid
Planned grid



Grid distance / Settlement	Near (<5 km)	Medium (5-20 km)	Far (>20 km)
Urban	Grid	Mini-grid	
Rural – high demand	Grid	Mini-grid	
Rural – low demand	Stand-alone system		

Decentralised solutions key to achieving access by 2030

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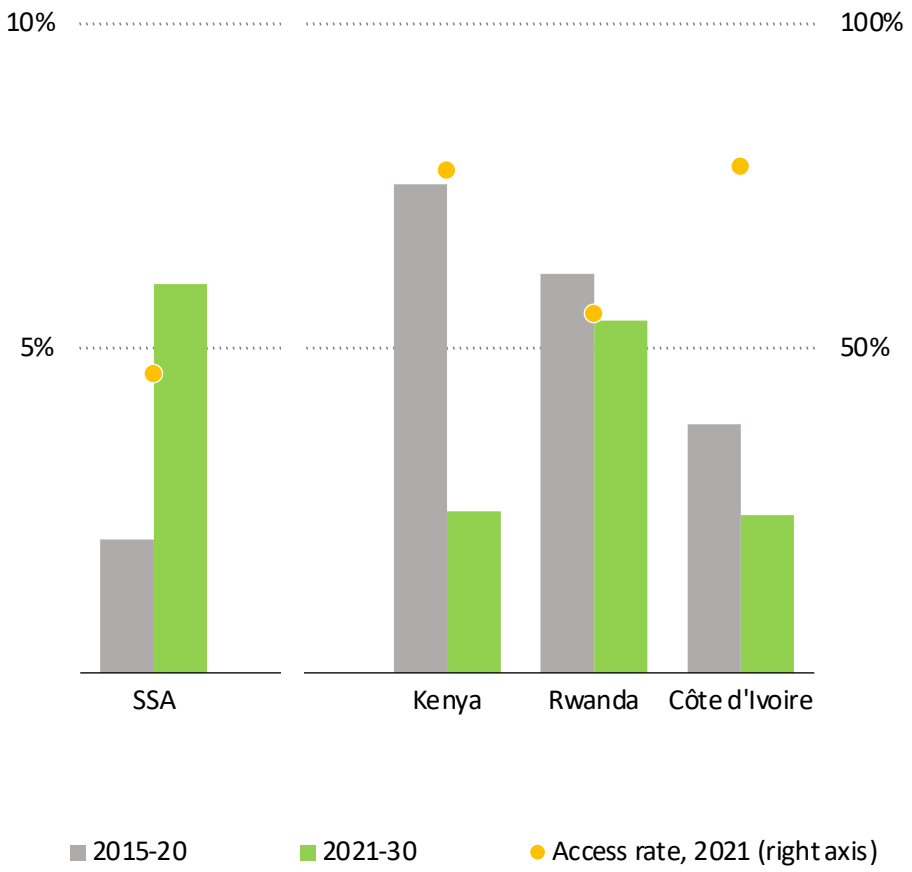
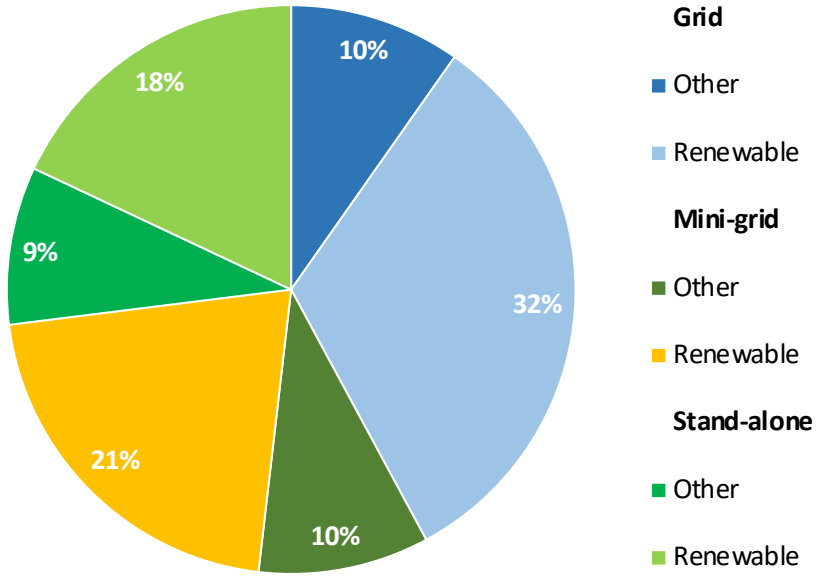
Average annual improvement in access rate

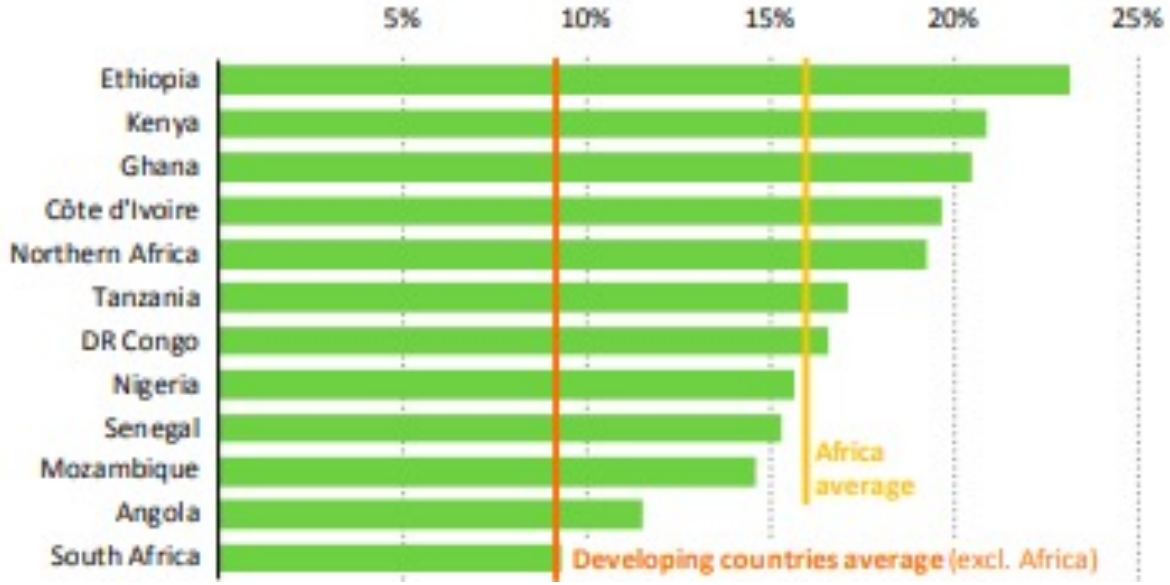


People gaining access by technology 2022-30



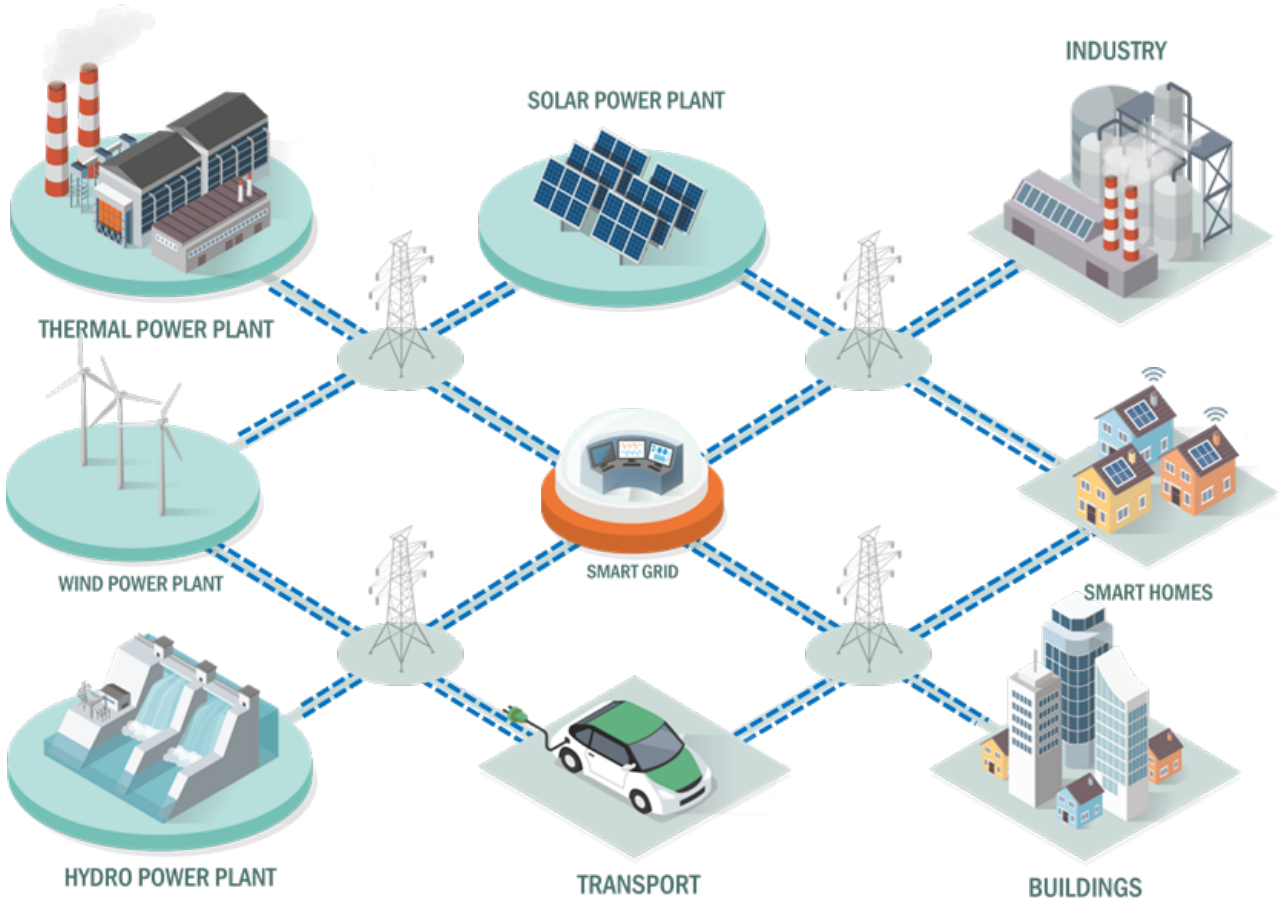
Efficiency and reliability challenges

Average electricity losses in selected power systems



Electricity demand served by back – up generators & share of hours electricity lost to outages

Digitalisation for power system transformation



Traditional system

Centralised / dispatchable

High inertia and stability

Central planning

One way flows of energy and communication

Closed networks, few devices

New system

Decentralised / variable generation

Low system inertia from rotating machines

Multiple actors / competitive markets

Two way flows of energy and communication

Open networks and many devices

Changing climate patterns

What benefits can digitalisation unlock?

Security/Reliability	Efficiency	Environmental	Economic
Reduced sustained outages	Reduced line losses	Reduced GHG emissions	Reduced total system cost
Reduced system transients	Improved network transparency	Increased integration of renewable energies	Reduced meter reading cost
Reduced major outages occurrence	Improved load management	Integration of EV	Reduction of electricity bills of consumers
Reduced restoration time	Optimum utilization of assets	Increased storage	Efficient revenue management
Reduced wide-scale black outs	Reduced congestion		Reduced operation cost
Self-healing capability			Reduced maintenance cost (reduced equipment failure)
Stabilization of network			Reduced ancillary service cost
			Reduced congestion cost
			Reduced commercial/ technical losses

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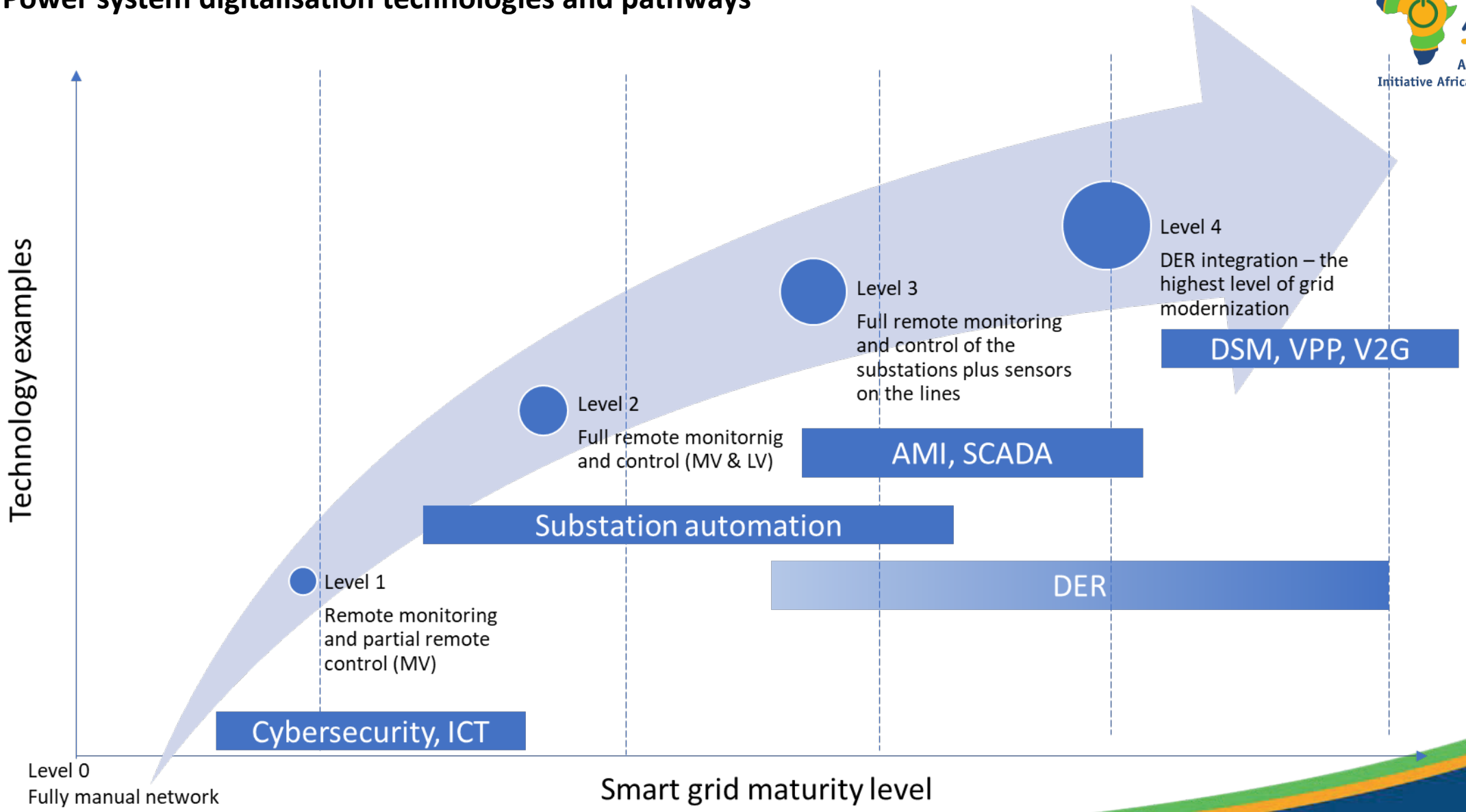
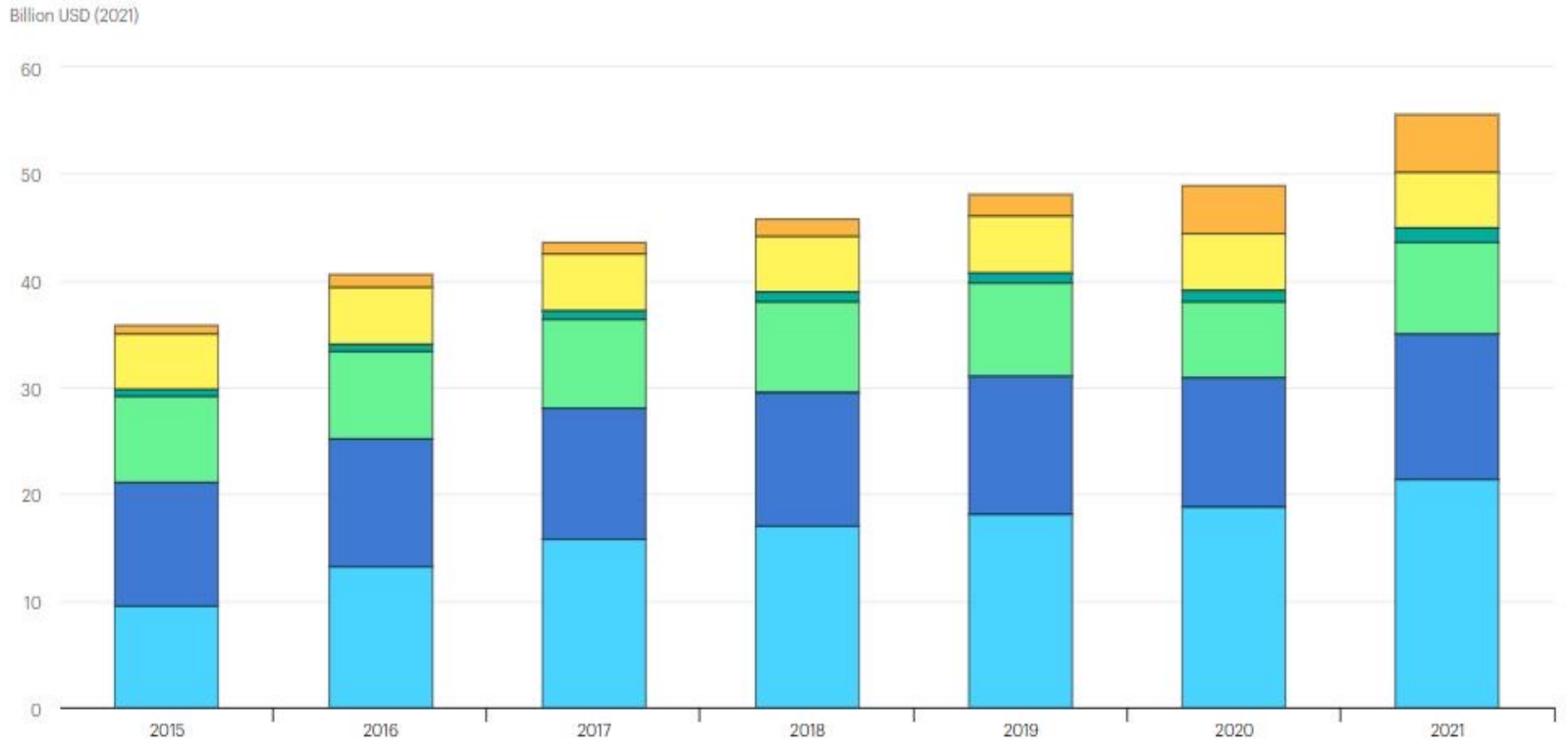
Power system digitalisation technologies and pathways



Global investments in digital infrastructure



Smart meters · Automation and management systems · Networking and communications · Analytics · Transformers · EV public charging infrastructure

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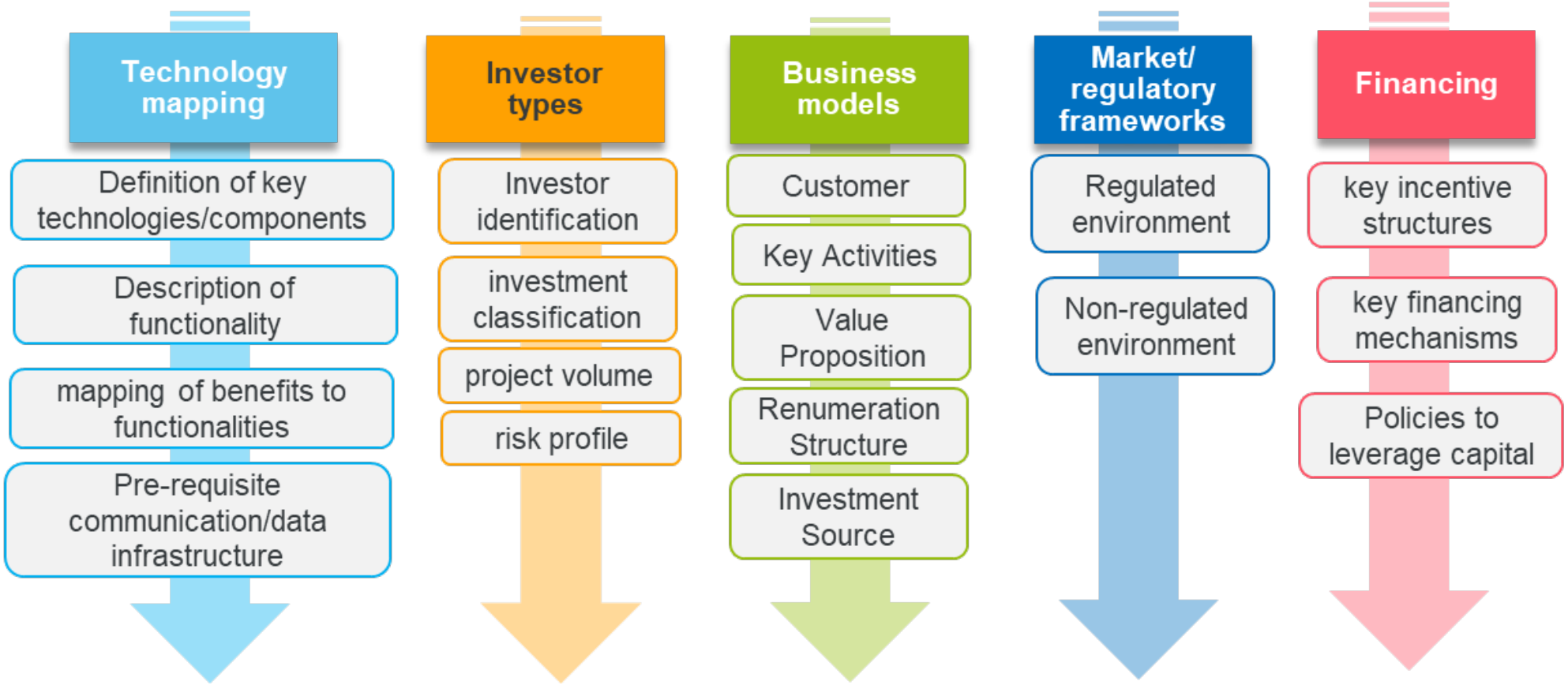
Smart grid investment aspects



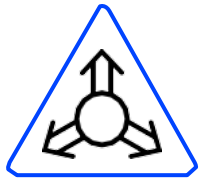
Challenges and what can be done

Data challenges

- Data-sharing platforms
- Harmonisation standards
- Data protection frameworks, transparent communication

Insufficient co-ordination

- Develop communities of practice
- Create knowledge-sharing platforms
- Create cross-cutting networks
- Create special-purpose vehicles

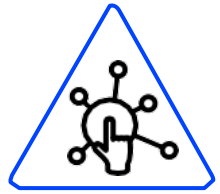


Lack of capacity

- Create initiatives to attract capacity and skills
- Develop opportunities for knowledge exchange
- Develop training and upskilling programmes

Access to finance

- Stimulate public-private partnerships
- Support the creation of new instruments e.g. green bonds
- Redirect funding and develop dedicated financing vehicles
- Introduce training to develop bankable projects
- Support the creation of revenue-generating business models

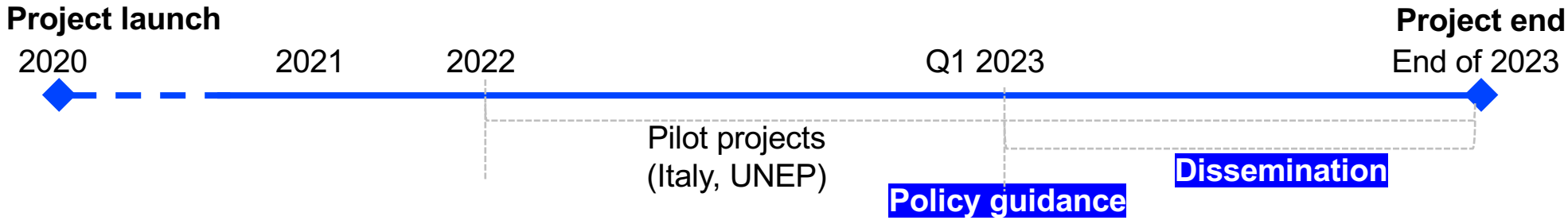


Digitalisation risks

- Develop cyber security frameworks and guidelines
- Create options for circularity
- Build capacity and create inclusive policies and projects

Digital Demand-Driven Electricity Networks Initiative (3DEN)

- **Aim of the Project** - providing **actionable guidance** to policy makers on the policy, regulatory, technology and investment context needed to accelerate progress on **power system decarbonisation and modernisation** and **effective utilisation of demand side resources**
- **Outputs**
  - **2 Policy guidance reports** (release H1 2023), tools and intermediate outputs, including articles and commentaries
  - Thematic and regional events and workshops
  - **G20 Report** "**Empowering Cities toward Net Zero Emissions**: Resilient, smart and sustainable cities towards a sustainable energy future", released in July 2021
- **Global scope, geographic focus**, including but not limited to **Brazil, Colombia, India, Indonesia, Morocco, South Africa, Tunisia**, and **Latin America, Africa, South East Asia** regions. Ongoing engagement with a **Consultative Group of Experts** (37 members from 14 countries)
- Italy / UNEP are supporting **pilot projects** that will be implemented **in 2022/23** to test new approaches on demand side and distributed energy resources in (1) Urban contexts, (2) Islanded systems, (3) Existing grid assets – **learnings will feed into 3DEN analysis**.
- **Project timeline**



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