

GHANA

Ghana targets universal access to energy in the upcoming years: as electrification rates have grown significantly recently, the demand has risen, opening opportunities in the transmission and distribution sectors to modernize and extend the electrical grid.



NATIONAL CONTEXT

Ease of doing business index		Global competitiveness index <i>(World rank)</i>	Population	31,072,945 inhabitants
World rank 118th	Sub-Saharan rank 13th		Human Development Index	0.611
		111st	GDP <i>(annualized average rate growth between 2010 and 2020)</i>	7.8%

ELECTRIFICATION RATE



94%

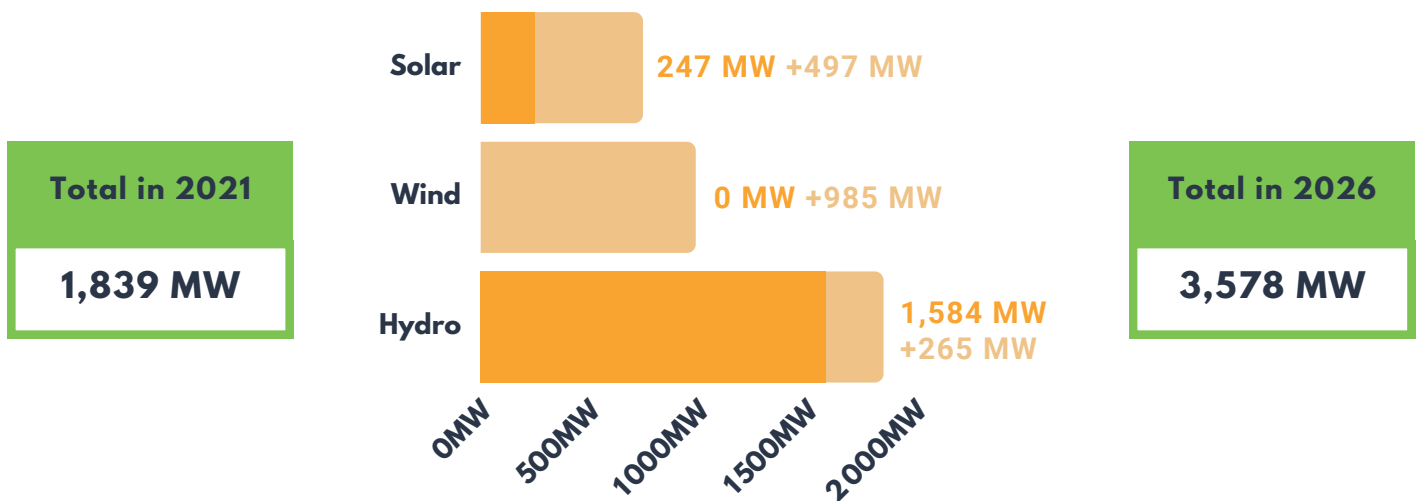


70%



84%

RENEWABLE ENERGY INSTALLED CAPACITY AND PROJECTIONS 2026



REGULATORY FRAMEWORK

- ▶ Ghana counts a significant number of **market incentives** and public funding programs to encourage the growth of the renewable energy installed capacity
- ▶ The National Energy Policy has sufficient mechanisms in order to achieve electrification targets in the medium term

Data gathered with the support of Minsait. Full references available in the published report - June 2022

OPPORTUNITIES

Mini-Grids & Off-grids



There are limited ongoing mini and off grid projects in Ghana compared to other sub-Saharan African countries, as **electrification rates are already high**.



Smart Grids

Ghana's electric grid uses old technology, not having incorporated new digital technologies extensively, yet **with considerable drivers for its development**.

Energy Storage



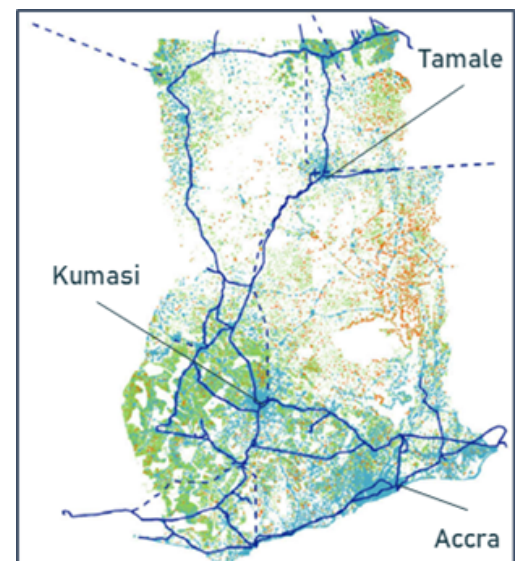
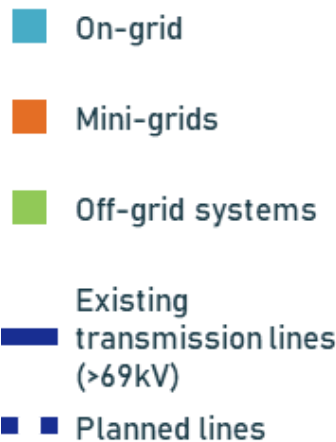
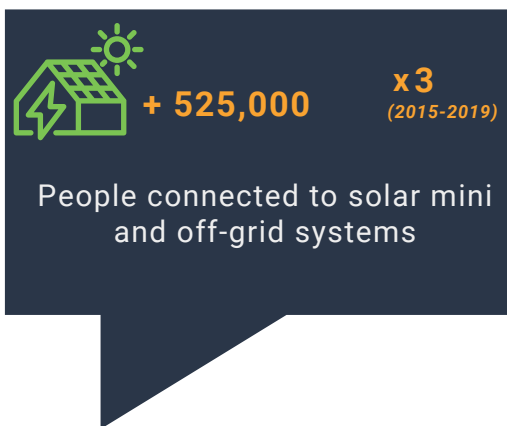
Despite having little activity in energy storage, several projects have been announced recently, and **energy storage-related regulatory framework development is expected for the coming years**.



Electrical Equipment

Electrical equipment related to renewable energies is mainly focused on solar, and in particular in Solar Lighting, yet there is a need to import more electrical equipment to **modernize the existing electrical equipment**.

Ghana planned electricity connections by 2030



RESEARCH & DEVELOPMENT

- ▶ Ghana stands out in terms of R&D in **specific technologies**, battery energy storage systems (with some innovative projects such as Huawei, the largest BESS company in Africa), in wind, and some bioenergy projects

KEY STAKEHOLDERS

- ▶ The main stakeholders are still public, yet the **RE market tends to liberalize**
- ▶ Private companies are mainly focused on solar (installers, distributors and EPCs)

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KENYA

Kenya has the highest renewable energy (RE) installed capacity within ESECA target countries, as well as the most diversified energy mix. The country has a good context for smart grids development, with public and private digitalization initiatives.



NATIONAL CONTEXT

Ease of doing business index		Global competitiveness index <i>(World rank)</i>	Population	53,771,300 inhabitants
World rank 56th	Sub-Saharan rank 3rd		Human Development Index	0.601
		95th	GDP <i>(annualized average rate growth between 2010 and 2020)</i>	8.3%

ELECTRIFICATION RATE



91%

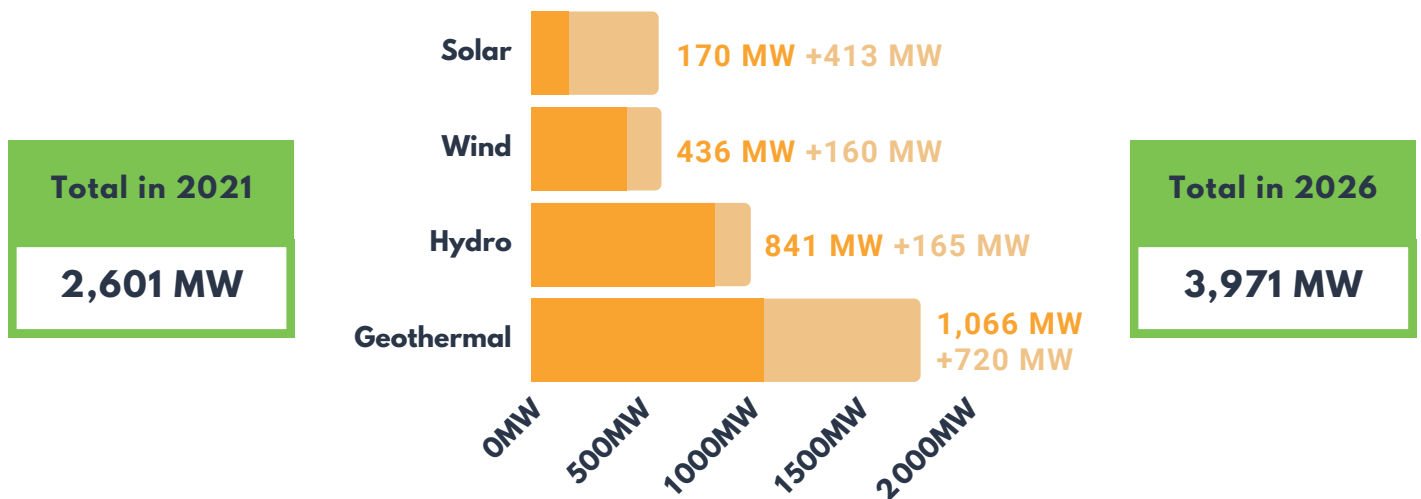


62%



70%

RENEWABLE ENERGY INSTALLED CAPACITY AND PROJECTIONS 2026



REGULATORY FRAMEWORK

- The energy sector is mainly structured around the Ministry of Energy and dominated by state-owned companies
- The **Kenya National Electrification Strategy** (2018) is the most relevant current document for the country's energy sector and market incentives in RE have been recently included

Data gathered with the support of Minsait. Full references available in the published report - June 2022

OPPORTUNITIES

Mini-Grids & Off-grids



Public initiatives as well as private companies are currently launching mini grids projects in Kenya, scattered throughout the country, with **more than 150 new solar powered mini-grids** expected to be developed in the medium term.



Smart Grids

Kenya presents a good context for the development of smart grids, encouraging both public institutions and private companies' initiatives for **grid digitalization**. Automation and digital control systems are the most interesting technologies.

Energy Storage

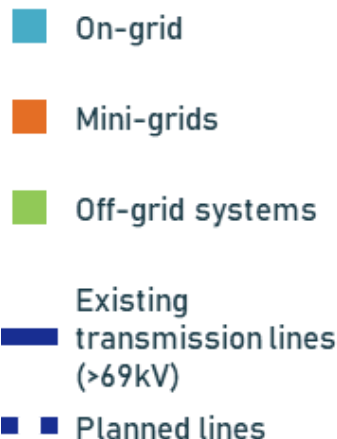
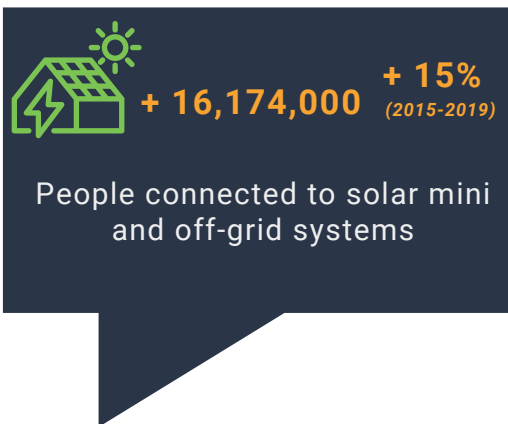


Within sub-Saharan Africa, Kenya has one of the **most developed Battery Energy Storage Systems markets**, and it is expected to be highly supported in the next decade.

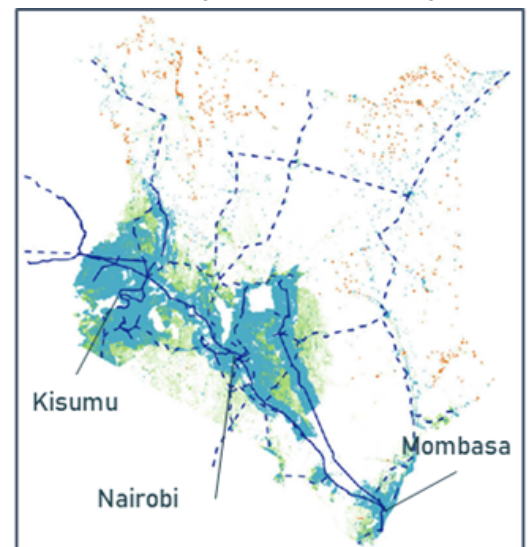


Electrical Equipment

Kenya is the country within the 5 analysed with the highest amount – in USD - of electrical equipment imports due to their **grid modernization and development plans**.



Kenya planned electricity connections by 2030



RESEARCH & DEVELOPMENT

▶ The number of R&D centres active in renewable energies is much higher in Kenya than in other African countries

KEY STAKEHOLDERS

▶ The most important stakeholders in renewable energies are in the public sector

▶ Universities and RE associations are numerous and active in RE, with **continuous collaboration with R&D private centres**

RWANDA

Rwanda stands out as the country with the second position in the Ease of Doing Business Index in sub-Saharan Africa, with a clear tendency to encourage private investment, especially targeting rural electrification projects.



NATIONAL CONTEXT

Ease of doing business index		Global competitiveness index <i>(World rank)</i>	Population	12,952,209 inhabitants
World rank 38th	Sub-Saharan rank 2nd		Human Development Index	0.543
		100st	GDP <i>(annualized average rate growth between 2010 and 2020)</i>	5.4%

ELECTRIFICATION RATE



93%

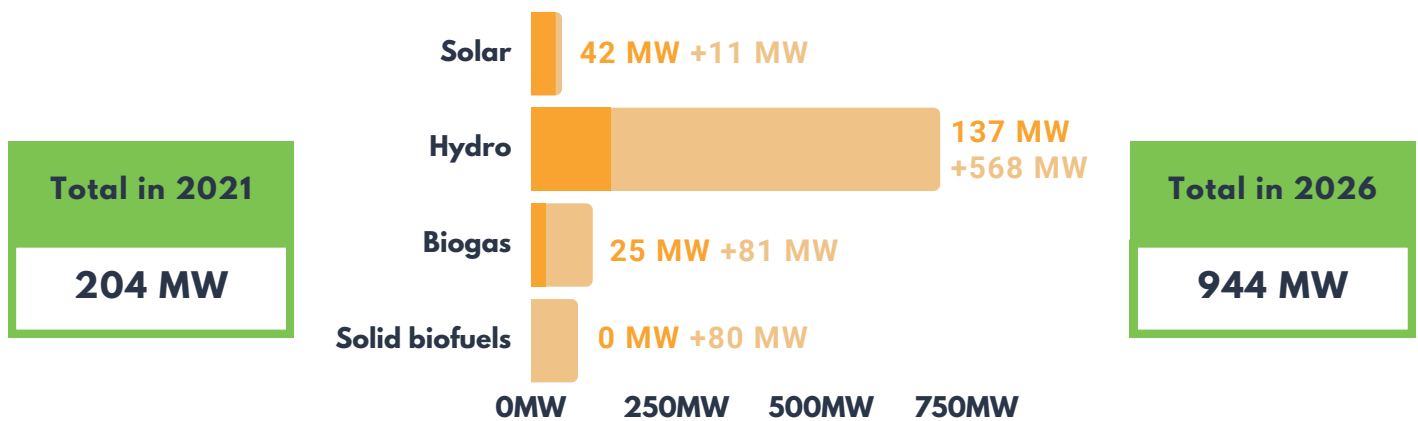


26%



46%

RENEWABLE ENERGY INSTALLED CAPACITY AND PROJECTIONS 2026



REGULATORY FRAMEWORK

- The National Energy Policy of 2015 has a clear tendency to encourage **private investment**
- Most of the existing funding programs in the country are aimed at financing **rural electrification projects** through off-grid systems

Data gathered with the support of Minsait. Full references available in the published report - June 2022

OPPORTUNITIES

Mini-Grids & Off-grids



Due to Rwanda's high hydropower resource potential and geographical characteristics, **small and medium hydro power plants** will be highly developed in the coming years.



Smart Grids

Rwanda is facing significant challenges for the implementation of smart grids, yet there are **some ongoing projects**. Smart grids development opportunities are linked to off grid solar home systems, and especially to incident management solutions.

Energy Storage



In the last 5 years, there is a growing activity related to energy storage solutions in Rwanda, **driven mainly by foreign private companies**.



Electrical Equipment

Rwanda's electrical equipment market is still very low. However, the Rwandan Ministry of Infrastructure has set out **several initiatives for investors** interested in the energy sector, such as free taxes on electrical equipment during energy projects development.

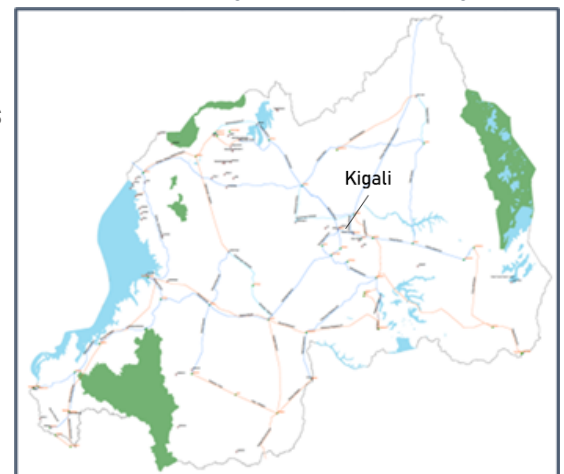


+ 2,513,000 **+ 44%**
(2015-2019)

People connected to solar mini and off-grid systems



Rwanda planned electricity connections by 2030



RESEARCH & DEVELOPMENT

- ▶ The African Centre of Excellence in Energy for Sustainable Development is the only R&D centre exclusively dedicated to renewable energies
- ▶ **Smart grids** have been identified by the Government as one of the destinations for RE R&D due to their relevance

KEY STAKEHOLDERS

- ▶ High number of stakeholders in RE compared to the country size
- ▶ **IPPs are relevant stakeholders** and exploited, in 2021, around 51% of the country's total installed capacity

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SENEGAL

Senegal has many assets to offer: a well-organized electricity sector, developed electricity transmission lines and highly qualified electrical engineers and power sector technicians to maintain the integrity and stability of the network.



NATIONAL CONTEXT

Ease of doing business index		Global competitiveness index <i>(World rank)</i>	Population	16,743,930 inhabitants
World rank	Sub-Saharan rank		Human Development Index	0.512
123th	16th	114th	GDP <i>(annualized average rate growth between 2010 and 2020)</i>	4.3%

ELECTRIFICATION RATE



95%

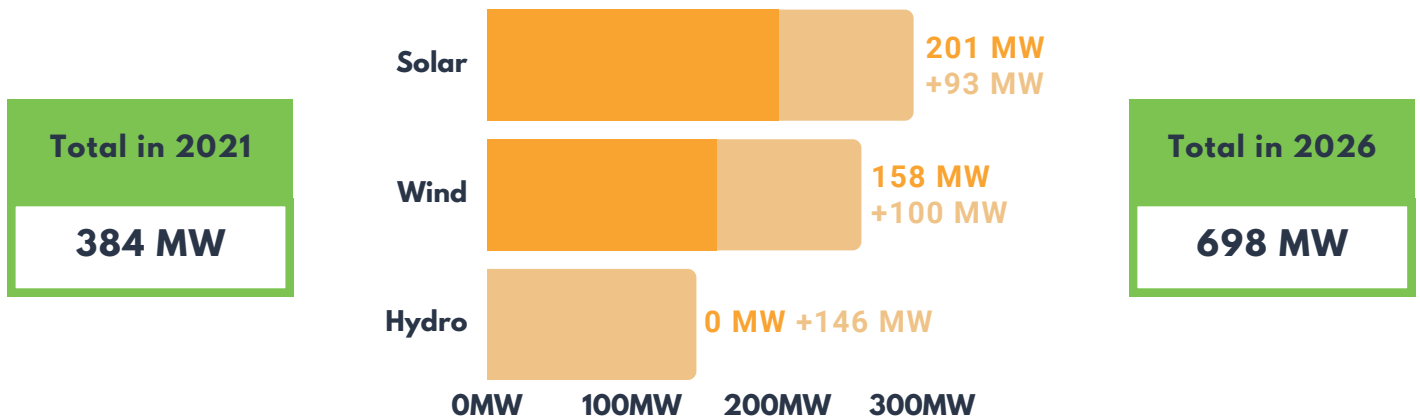


48%



70%

RENEWABLE ENERGY INSTALLED CAPACITY AND PROJECTIONS 2026



REGULATORY FRAMEWORK

- SENELEC has a monopoly in transmission and distribution, but in production it reaches **power purchase agreements** with IPPs
- **VAT exemptions** on renewable energy products is the most interesting market incentive

Data gathered with the support of Minsait. Full references available in the published report - June 2022

OPPORTUNITIES

Mini-Grids & Off-grids



Despite the high electrification rates, by 2021 Senegal was the **second country worldwide with the highest number of planned mini grids**, planning more than 1,200 new mini grid connections.



Smart Grids

Smart grid projects in Senegal have begun to be deployed in the last 3 years in order to integrate renewable energies, **improve access to electricity and avoid technical losses**.

Energy Storage

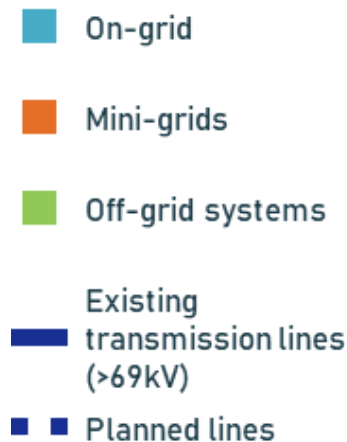
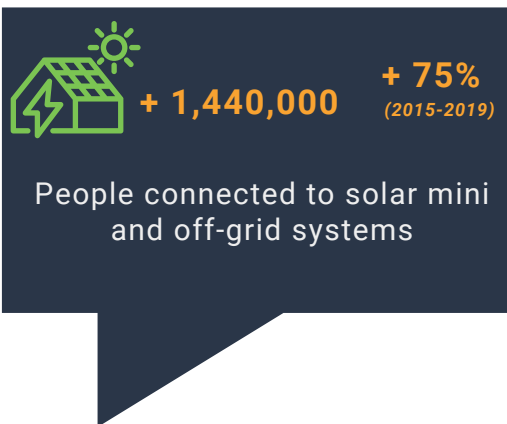


First utility scale Battery Energy Storage System project is under development in the Taiba N'diaye Wind Farm (40 MW battery system), yet the activity in relation to energy storage in Senegal is **still incipient**.

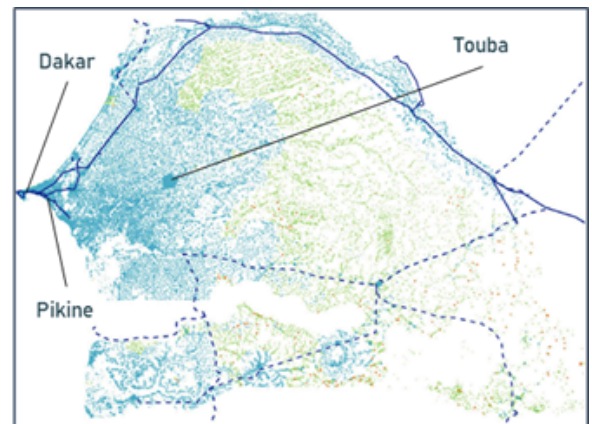


Electrical Equipment

Although the equipment related to solar installations is the most developed in recent years, it is insufficient to meet the current demand, thus having to **import large quantities of equipment**.



Senegal planned electricity connections by 2030



RESEARCH & DEVELOPMENT

- Some public agencies have clear R&D guidelines
- **Solar** is the technology that is generating the most R&D activity

KEY STAKEHOLDERS

- Public and governmental agents, the public company SENELEC and IPPs, are the most relevant stakeholders in the RE sector
- Private companies (IPP, installers and EPCs) are mainly focused on solar, yet **wind is having a growing activity**

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TANZANIA

Although Tanzania business indicators are the lowest of the analyzed countries, the country has great solar and hydro resources, and the will to increase the investment in mini and off-grid systems, especially to boost rural electrification.



NATIONAL CONTEXT

Ease of doing business index		Global competitiveness index <i>(World rank)</i>	Population	59,734,213 inhabitants
World rank 141st	Sub-Saharan rank 22nd		Human Development Index	0.529
		N.D	GDP <i>(annualized average rate growth between 2010 and 2020)</i>	6.9%

ELECTRIFICATION RATE



73%

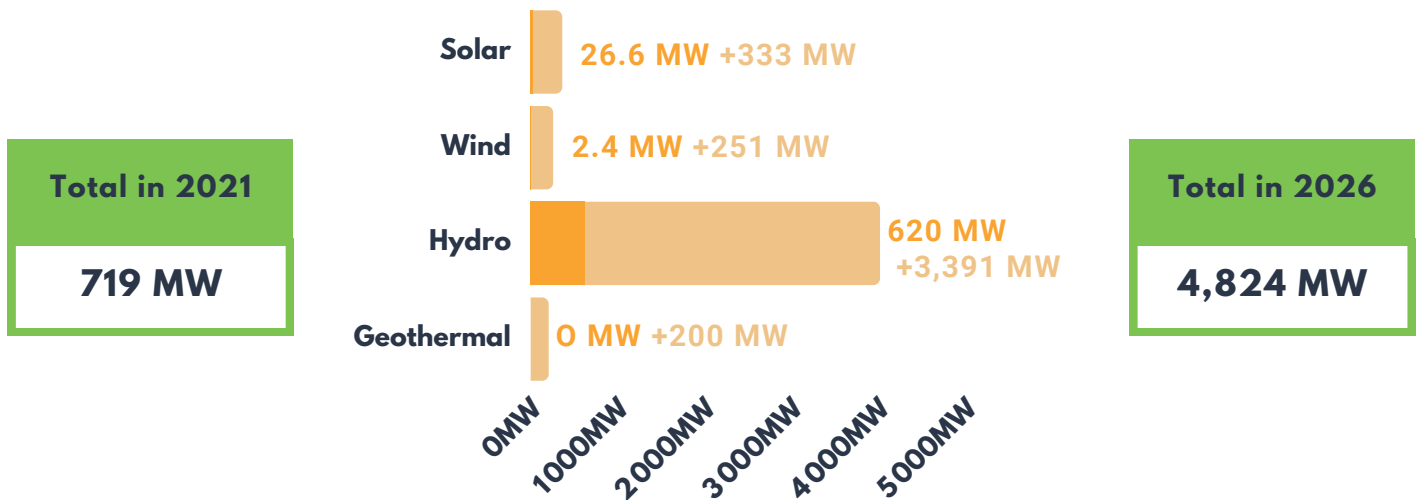


19%



38%

RENEWABLE ENERGY INSTALLED CAPACITY AND PROJECTIONS 2026



REGULATORY FRAMEWORK

- Among the public companies, TANESCO is the most relevant, being responsible for a large part of the generation (78%), and having the monopoly on transmission
- Tanzania has some **notable market incentives**: VAT and Duty exemptions for some renewable energy (RE) products and Feed-in-Tariffs scheme

Data gathered with the support of Minsait. Full references available in the published report - June 2022

OPPORTUNITIES

Mini-Grids & Off-grids



Tanzania is the sub-Saharan African country with the most opportunities for the development of mini and off grid systems, especially in the northern regions.

Energy Storage



There is a growing activity regarding battery storage systems (BES) in Tanzania, mainly because the use of photovoltaic combined with BES is one of the **most viable options for rural electrification**.



Smart Grids

Although off-grid has a great potential in Tanzania, smart grids market is very limited currently as **electrification rates are low and the technology is still incipient**.



Electrical Equipment

Electrical equipment market is very limited, and mainly concentrated around Dar-es-Salaam. Even though **imports of electrical equipment** have increased significantly in recent years, they are **insufficient**.



+ 3,551,000

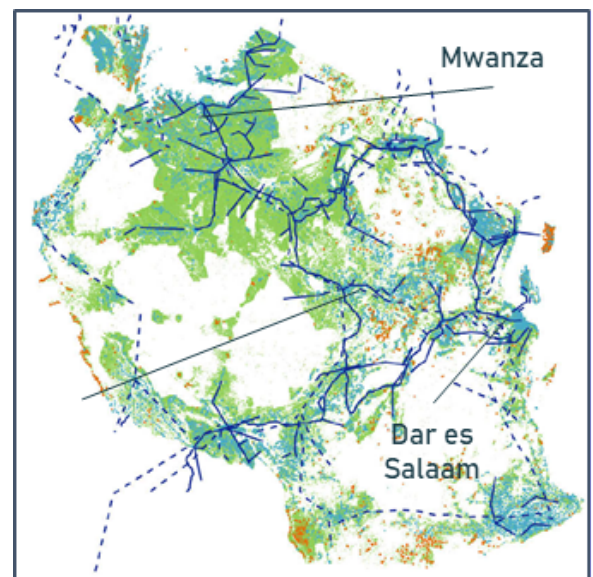
-67%*
(2015-2019)

People connected to solar mini and off-grid systems

*Decrease due to the drop of solar lightning systems in favor of mini-grids. Number of people connected to mini grids has tripled in the last 5 years.

- On-grid
- Mini-grids
- Off-grid systems
- Existing transmission lines (>69kV)
- Planned lines

Tanzania planned electricity connections by 2030



RESEARCH & DEVELOPMENT

- ▶ Renewable Energy Technology Centre (RETC) and the renewable energy associations are the most active agencies
- ▶ Hydropower is the most developed technology in recent years, with the **focus on small-scale projects**

KEY STAKEHOLDERS

- ▶ The **stakeholders map is relatively dense** compared to other East African countries
- ▶ Universities and R&D centres are very active in renewable energies
- ▶ TAREA stands out as the most active association in the RE sector