



## Tracking sub-Saharan Africa's Distributed Energy Networks

### *Acknowledgements*

This white paper was put together with insights from the following industry experts:



**William Brent**, Chief Communications Officer, **Power for All**



**Torsten Schreiber**, Founder, **Africa GreenTec**

**Dr Arnoldus Mateo van den Hurk Mir**, General Manager,  
**Renewable Energy and Mining International Observatory**



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## Executive summary

Few renewable opportunities are potentially as great as that offered by the off-grid energy market in sub-Saharan Africa. For the people who live in the region without electricity, renewable energy is the most obvious way of gaining access to power. And while it is true that the market is mostly characterised by low-income families that can only afford to pay a minimal amount for electricity, renewable energy also has the potential to supply commercial and industrial concerns suffering from poor grid connectivity and high diesel prices.

These opportunities will be top of mind with industry executives gathering in Cape Town on November 26 and 27 for New Energy Update's Africa New Energy conference and exhibition. In advance of the event, this paper provides a brief review of decentralised energy networks in sub-Saharan Africa.

## The market

The market for decentralised energy systems in sub-Saharan Africa is still in its infancy, according to William Brent, chief communications officer for Power for All, a global coalition of 200 private and public organizations campaigning to deliver universal energy access. While demand for solar home kits, which provide power for basic lighting and small consumer electronics, has mushroomed in the last couple of years, the introduction of larger systems has been slow to take off.

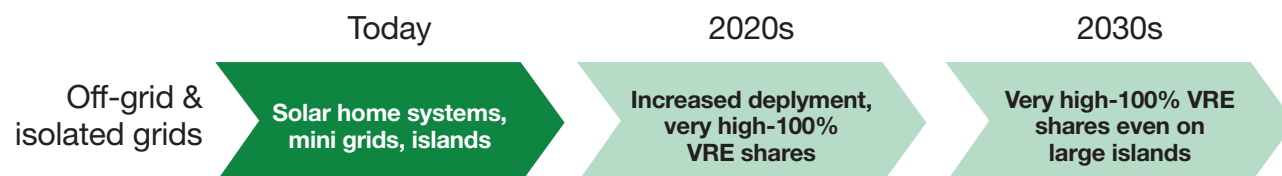
"We're adding dozens, low hundreds a year for the private sector," says Brent.

He estimates the region will need to reach between 100,000 and 200,000 systems by 2030 in order to cover a population of some 450 million.

## The technologies

The main new technology for decentralised power generation is solar PV, increasingly tied to battery storage. This is now cost competitive with diesel generation in many parts of Africa. Plus, it is easier to maintain. One example of how solar-plus-storage can be mass produced for use in sub-Saharan off-grid markets is the concept being commercialised by Africa GreenTec, a German start-up.

### Electricity storage needs in the off-grid energy transition (VRE stands for variable renewable energy).



Source: International Renewable Energy Agency.





The company, which hopes to bring electricity to 3 million people by 2030, has created a solar-plus-battery system that fits into a 40-foot container for shipping.<sup>1</sup> On installation, which takes two days including training for a local team, the solar panels are spread out over a pre-fabricated canopy. The system's power electronics and lithium-ion batteries remain inside the container.<sup>2</sup>

## Success to date

Africa GreenTec is in talks with at least 150 sub-Saharan communities and is looking to install containers in 25 Malian villages this year alone, or around two a month.<sup>3</sup> More of these large-scale rollout programmes are needed, though. Although the appetite for off-grid renewables is increasing, for the time being deployment seems to be lagging behind population growth in the region.

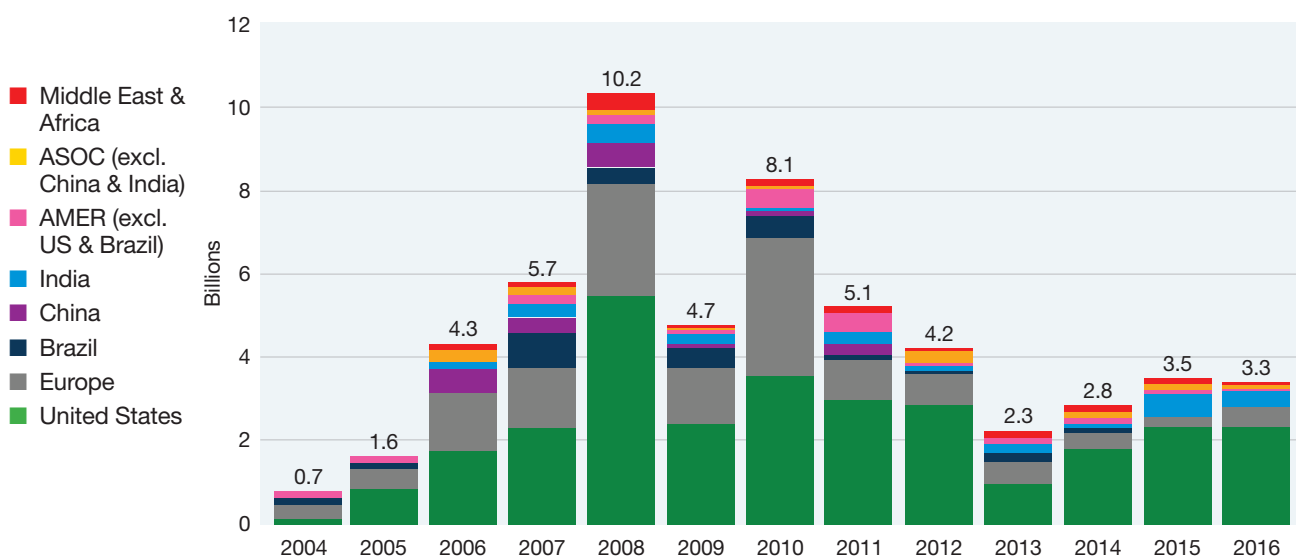
According to Power for All: "The energy access gap is decreasing everywhere except sub-Saharan Africa, where, over 2012-2014, energy access growth of 19 million people per year was outpaced by population growth of 25 million people per year."<sup>4</sup>

One factor that might help is the growth of solar kit vendors. Reuters says at least 11 companies are now serving the solar lighting sector, with major European utilities taking notice.<sup>5</sup> It remains to be seen if their activities can help boost the implementation of larger systems.

## Cost and financing

The amount that customers pay for off-grid renewable electricity varies widely, Brent says. Nevertheless, the business case remains challenging in most markets, as does the quest for finance. At Africa GreenTec, for example, "We tried to get finance for Mali and in the end it was only possible to find investors by giving them a security in the asset," says founder Torsten Schreiber.

**Venture capital and private equity new investments in renewable energy by region, 2004-2016, in \$billions.**



Source: Bloomberg New Energy Finance/UN Environment.



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This led the company to come up with a mobile solar-plus-storage system that could be moved to a new community if an existing offtaker refused to keep up payments. More widely, says Brent, “There is a growing recognition that the only way that mini-grids will be successful is with subsidies. That puts them on a level playing field with public utilities.”

## Remaining challenges

Another challenge is that renewable energy developers may lack knowledge of specific off-grid customer requirements. Dr Arnoldus Mateo van den Hurk Mir, general manager of the Renewable Energy and Mining International Observatory, says this is the case with the mineral resources sector, potentially a major consumer of renewable energy.

“Renewable developers have experience in other markets with different rules,” he says. “Usually, they never have visited a mine. They need specific training.”

## Outlook and conclusions

The International Finance Corporation and the Lighting Global initiative of the World Bank estimate the world’s off-grid solar sector, from solar lights to plug-and-play home kits and do-it-yourself systems, is worth \$1bn per year in sales revenue terms.<sup>6</sup> That amount is expected to grow eightfold by 2022<sup>7</sup>, but for now challenges remain in growing the market in sub-Saharan Africa.

The main stumbling blocks appear to be around access to finance, which, in turn, is related to the regulatory framework of sub-Saharan markets. Nigeria has the best policy framework today, says Brent. And what is clear, he says, is that “the technology is not really an issue nowadays.”

## References

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