

FIELDSTONE

RENEWABLES INDEX



FARI Reviews the Commercial and Industrial Sector (C&I)

Taking a break from examining utility scale opportunities in different markets at length, FARI will review the fast-growing C&I sector for renewables (a synopsis of the state of play for the utility scale market follows this review)

According to a recently released report 494 MW of solar C&I projects have been commissioned in Sub-Saharan Africa (excluding South Africa). When you add this to the South African and Moroccan totals (discussed herein), the result is astounding especially considering the state of C&I renewables only a few years ago. Standalone projects are a big part of this result as commercial and industrial clients seek to free themselves from the costs, uncertainty around dependability of supply and legacy issues of the utilities. As one African industrialist succinctly put it: "if you depend on the utility in the future, it will be very expensive power or the power simply won't be there". The move towards renewables over the loud, smoky diesel gensets is driven by pricing more than these external factors – solar generation is up to 6 times cheaper per kwh and below the operating cost, hence integrating renewable elements makes sense even where 24-hour power is required.

Utilities are put in the unenviable position of having their best customers at risk which leaves them with a stranded cost problem and uncertainty regarding future demand and development, while they stand responsible for providing power to the general populace. Should they embrace this disruption or seek to slow it while they fulfill their broader mission to all consumers?

Governments are in a bind as they consider whether this trend can or should be stopped. What is the cost to the broader economy of protecting the utility? What if the utility is the single largest employer in the country?

None of these answers are simple, but the move towards more distributed power, including self-generation has to be

embraced for the simple reason that resistance ends in uneconomic outcomes that come at great cost and missed opportunities. A first cut list of advantages includes:

- Ever improving grid technology and liberalization of the grid allows diverse decentralized sources of power to serve customers – including permitting private sources to sell excess power into the grid.
- The costs of investing in large thermal plants is minimized. In the African context, the scale and complexity has limited the number of successful projects in all cases.
- The cost of expanding the high voltage grid can be avoided as regional and local generation can be sufficient.
- Grid losses are reduced resulting in lower transmission and distribution costs.
- In the likely event that battery technology becomes sufficiently economic, the ability to use distributed sources to provide base-load power will advance.
- The excess power of C&I can provide power to unserved consumers as anchor generation locations (especially if required).
- An increased pool of investors into the sector, in particular where market participants invest in their own power plants.

It is clear that renewable C&I is not the answer to all of Africa's energy challenges, but it will be an increasing part of the mix. Hence, the best response from Governments, and incumbent utilities is to thoughtfully integrate this additional capacity as opposed to try and pretend it is not there or to squelch it.

We have taken this proposition to anchor our analysis of where C&I is most attractive.

Is there regulatory encouragement (or at least indifference)? What is the cost differential between utility and C&I renewable power? How acute are dependability issues in utility power? With these factors in mind, we have formulated a list of markets which are indicative of the progress afoot:

Morocco: has a specific law which allows renewable IPPs to sell 20% of their annual production to the market – this applies to generators down to 50 MW in size.

This kind of incentive at a reasonable tariff can make own generation quite attractive, as evidenced by a 120 MW project backed by industrial use recently constructed.

In **Nigeria**, a "three-hour power outage" might refer to the amount of time electricity that was available as opposed to time off-line. The need for dependable power is the driver but the requirement for generation licenses of power over 1 MW is a limiting factor. Hence the heavy reliance on diesel. Nonetheless, the need seems to be pushing for more and more renewable and hybrid self-generation projects.

This places Nigeria in the ideal position for the development of C&I. Regulation is moving incrementally to support innovation, practically forced by the prevailing conditions; the lack of centrally generated power and the poor quality of distribution infrastructure creates a situation where win-win deals between local distribution companies and operators of captive power with surplus capacity are feasible. This could create higher utilisation rates while maintaining security of supply standards whilst at the same time lowering costs.

According to authorities in **Kenya**, the national grid produces surplus generation and additional generation is unnecessary. Consumers and informed observers note that this does not include provision of reliable electricity at a reasonable price. For this reason, C&I has expanded fivefold in the last five years. Even though current levels are modest, the regulatory environment does not contain absolute impediments to self-generation and certain incentives exist to produce power in underserved areas.

Net metering regulations form part of draft energy policy and which is being developed. According to the draft policy an owner of a renewable energy generation facility of up to 1 MW may enter into a net metering system agreement of with a distribution licensee or retailer in its service area.

South Africa's experience with recent electricity price increases, load shedding and the uncertainty of the future configuration (fate) of the incumbent utility, have been a major driver in C&I development in the country. Licensure is required for generation of more than 1 MW, but that has not discouraged industrial and commercial facilities from forging ahead with their own self-generation.

According to PQRS (local solar PV data and quality assurance entity) there were 90 260 installed and verified solar PV rooftop systems with a capacity of c.180 MW by 2017. There are more systems which have been installed but not verified.

When those are included installed capacity from rooftop solar are closer to 430 MW. Between November 2016 and November 2017 PQRS documented an increase in installation of 110 MW.

Currently, there are 500 pending applications for 1 400 MW of solar self-generation in the agricultural sector alone. This suggests that more welcoming regulation could lead to a material improvement in the supply-demand balance of the country. The costs of losing customers for the utility would have to be balanced by the broader positive impact of reliable supply to the country as a whole. The provisions in the draft IRP indicate that municipalities may purchase power from third party sources as a bridge to resolve this dilemma.

Burkina Faso is the somewhat unlikely site of what is claimed to be the largest renewable C&I mining development in the continent. The 15 MW PV installation offsets the needs of the existing 55 MW heavy fuel oil development at a gold mine. The advantage of not having to transport fuel in a relatively isolated setting and a regulatory system that does not block such development are the key.

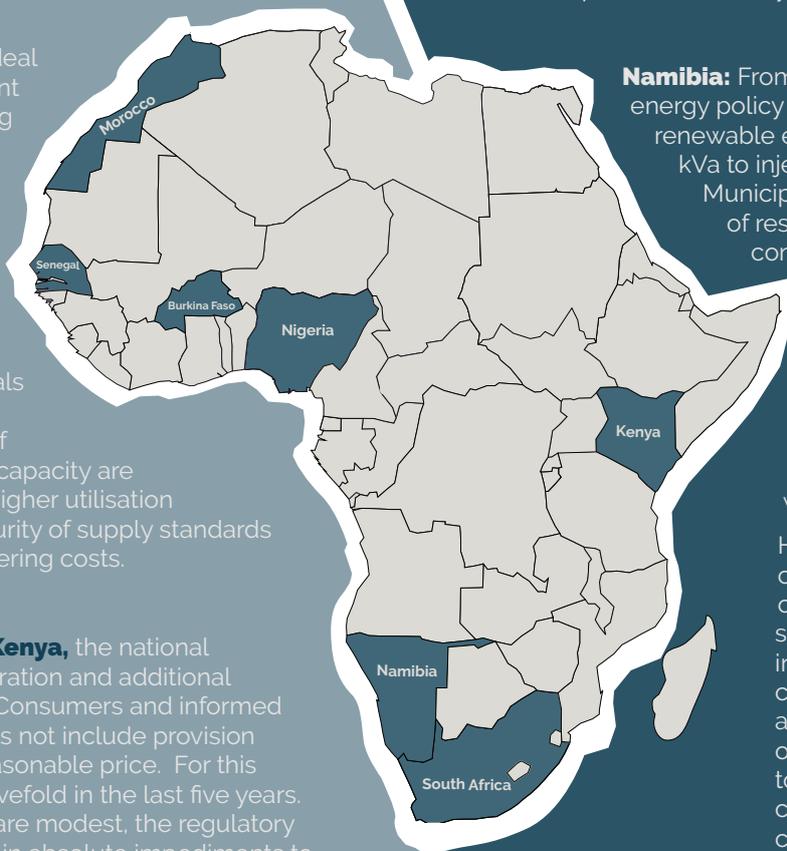
Namibia: From July 1 2017 Namibia's energy policy was amended to allow for renewable energy projects of up to 500 kVa to inject excess power into the grid. Municipalities collected information of residents with registered, grid-connected solar systems to enable it to implement the new policy.

A 6.6 MW solar plant has been constructed north of the country for a cement producer. The project was signed under a 15-year PPA with the factory.

High electricity prices in the country are driving the up-take of off-grid solar (with battery systems in some cases) even in areas where there is grid-connected power. Windhoek alone has an estimated 20 MW of off-grid power. According to Climatescope off-grid connections are vital for the country to meet its 50% rural electrification target by 2020.

In **Senegal**, a cement plant whose energy requirements account for 30% of the cost of production, not to mention the ecological impact of the use of fuel oil, commissioned the design of a 7 MW solution that will supplement the six generators currently supplying its facilities. The plant will host Africa's largest off-grid self-consumption tracker with the goal of cutting the cost per kilowatt hour by three and reducing Co² by 10,000 tonnes per year.

Several solar power plant projects are underway at various African industrial sites. The implementation of sectoral reforms promoting the deployment of renewable energies has facilitated the emergence of these projects aiming, as a priority, self-consumption of private customers.



Financing Challenge

A real limiting factor of outsourced C&I is that the off-taker must have minimal credit quality in order to undertake such a project since even in the best of circumstances the period of payback is several years long. For some industries such as mining, the credit quality and even currency risk elements are superseded by the sale of international commodities. For other industries, banks have also offered developers the option of pooling projects and or offtakes to get a blended credit risk that would not be sufficient as a stand-alone credit. Certain lenders are also extending debt tenors beyond the historical 5-7 years to projects with off-takers that have strong credit. DFIs should continue to examine how they can offer credit support to C&I development in markets that are receptive to new projects. The incremental spread of generation may offer a way out of the grindingly slow process of introducing large new utility scale power plants.

Summary of policy relevant to C&I:

	Institutional setting	Licensing	Wheeling	Net Metering
Morocco	Renewable Energy Development Law 13.09 governs the deployment of large- and small-scale renewable energy.	To be entitled to produce electricity independently, private parties need: A simple declaration for small capacities producing less than 2 MW of electricity. An official authorization for sites exceeding an installed capacity of 2 MW.	Third parties are also guaranteed access to National Grids and are allowed to export, through inter-connection grids (Algeria-Spain), their surplus of electricity from renewable sources.	A net metering scheme exists and is enforced 58-15 law which compliments the 13-09 law on renewable energy. Private investors in renewable power are able to sell their surplus output to the grid, but no more than 20% of their annual production.
Nigeria	Regulation governing different permutations of off-grid exist.	Captive generators >1 MW requires a captive power permit which is valid for 5 years. No permit is required for self-generation <1 MW. A license is required for a PPA between a developer and off-taker.	Wheeling is not addressed in the renewable energy policy.	Not addressed in renewable energy policy.
Kenya	Process in place for the development of C&I solar. All projects, regardless of project size, must obtain a permit from the National Construction Authority (NCA), as well as a National Environment Management Authority (NEMA) license and local county approval.	Projects smaller than 1 MW that do not sell power to the grid do not require a generation permit or license from the Energy Regulatory Commission (ERC). 1,000-3000kw permit required >3,000kw license	Altering pricing to allow for a wheeling tariff for state transmission utility Kenya Electricity Transmission Company (KETRACO) is also being explored.	Net metering policy has been in draft for four years
South Africa	Electricity Regulation Act 4 of 2006 and Electricity Regulation Amendment Act 28 of 2007 (ERA): These regulations guide the issuance of licenses for generators and transmitters, wheelers and distributors of electricity. On 10 November 2017, amendments were made to Schedule 2 of the Act, which regulates categories of generation facilities and resellers who would be exempt from the licensing requirement.	Department of Energy (DoE), through the ERA, requires that all generation must be registered with NERSA and that a generation license must be obtained with exceptions including if the generation facility is < 1 MW and is off-grid and not having an interconnection agreement ⁷ and is operated solely to supply electricity to the owner.	SA has made effort to make wheeling possible, but these efforts have not been successful.	A national legal framework for commercially viable net metering schemes that would boost the residential and commercial PV

	Institutional setting	Licensing	Wheeling	Net Metering
Burkina Faso	Private sector may operate generation and off-grid distribution projects with capacity constraints. Subject to providing prior notification, captive solar power plants are also authorised in Burkina Faso (Article 27 of the Burkina Faso Electricity Law).	Low thresholds for mini-grid projects to require administrative approval (10 kW); projects below 10 kW still require a declaration that includes an environmental impact assessment.	No legislation permitting as mini grids (and C&I projects by implication) are not allowed to be profitable.	Net metering scheme in place. Any excess power produced may be sold, provided that the required license or authorisation is obtained (Article 27 of the Burkina Faso Electricity Law).
Namibia	Off-grid IPP projects are governed by the Government's Renewable Energy Policy and the off-grid master plan developed by the Ministry of Mines and Energy guides the procurement of off-grid projects. Small-scale IPPs can be procured through unsolicited and/or solicited procurement mechanisms.	Systems larger than 500 kw will require a license from the Electricity Control Board (ECB).	Not addressed in the country's off-grid energization master plan.	The on-site generation capacity of each net-metered facility must not exceed the lower of the facility's main electricity supply circuit breaker current rating (converted to kVA) and 500 kVA. All distribution customers may install a net metering facility subject to the Electricity Act and they do not have to acquire a generation license.
Senegal	The key off-grid initiative at present is the Renewable Energy for Senegal (ERSEN) off-grid Solar Energy Programme through concession contracts. Prior notification to the Ministry of Energy is required to set up a captive solar plant (Article 29 of the Senegalese Electricity Law).	Since 31 March 2009, independent producers have been able to sell electricity to "Large Consumers", subject to obtaining the relevant license. Article 29 of SENELEC's concession contract defines Large Consumers as those subscribing to an annual contract of: <ul style="list-style-type: none"> • 5 MW or more as of 31 March 2009; • a number of MW between 1 and 5 MW set by SENELEC and the regulatory authority between 31 March 2009 and 31 March 2019; and • 1 MW after 31 March 2019. 	Policy Development of the Energy Sector (LPDSE) which was updated in 2008. Decree No. 2011-2014 is the implementing instrument for RE produced captively.	Consultation process on tariffs to be paid by SENELEC will pay to independent producers is underway.

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