

RE TRENDS EAST AFRICA

Tracking regional renewable energy developments

Quarter 2, 2014



OPENING THOUGHTS: On-Grid Solar in East Africa Grows Up

Welcome! This is the 3rd installment of the ASD newsletter, which we hope will provide readers with inside information on renewable energy (and especially PV) markets in East Africa.

The East African solar market is now well into the transition from 100% off-grid to a mixed off and on-grid market. Following early sponsored demonstration grid connect projects in Kenya and Rwanda (UNEP Nairobi, SOS Mombasa, Kigali Solaire), private sector entities are now realizing that solar PV can cost-effectively lower electricity costs.

Over the last year, there have been interesting twists and turns in the solar industry. Consolidating international markets – where Germany has been a loser and China a winner – are still growing in spite of declining incentives in Europe. PV suppliers are looking for new markets. The US (where more PV was installed than in Germany last

year), Middle East and Africa (especially South Africa) are increasingly attractive destinations.

In East Africa, Governments are slowly coming to grips with PV as a part of distributed grid growth strategy. Notably, Rwanda is embarking on an 8.5 MW project that will make Kigali the temporary solar leader in the region.

In Kenya, the rather slow movement of the Government to approve much demanded net metering has led the private sector to go it alone. Surprisingly, the horticulture and flower industry (see below) is leading on-grid PV development. Already, more than 5 sites (>1.5MW) have been installed by players such as Azimuth, East Africa Solar and Chloride, and there is much more coming. Although off-grid tourism seemed like a market where solar was more cost effective and viable, flower farms seem to be more willing to invest in green energy for

embedded power needs that will not result in export to the grid.

Solar PV projects can be done as small and medium-sized rooftop projects and as larger MW-scale projects – though the former creates more job opportunities.

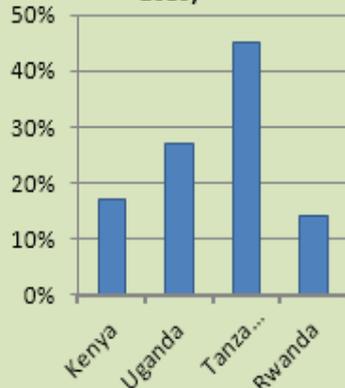
There is a need for private sector and Government to work together on both large and small grid connect solar projects in the region. PV should be seen as a complementary part of Kenya's 5000 MW plan. Indeed, in the short timeframe available, PV would be an easy (and trendy!) way for the Government to get a few hundred quick MW.

In this issue we explore some of these and other trends in more detail. Thanks for your interest in ASD and happy reading.

Mark Hankins, ASD CEO

ENERGY NUMBERS: Is Pico Solar Driving Down Kerosene Consumption?

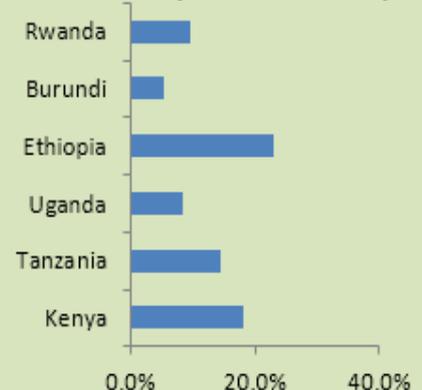
% Increase in Total Electricity Generation Capacity (2010-2013)



Kerosene Consumption (000 M³)



Access to Electricity (% of the Population Connected)



FEATURED STORY: Solar Energy for Floriculture and other Agri-Sectors



ASD Team Conducting an Energy Audit

Agriculture forms the backbone of the Kenyan economy, at 24% of GDP. One sector that has been growing steadily is the floriculture industry, which now commands a whopping 38% market share of the world's rose cut flowers, making Kenya a global leader.

Flower farming is technology intensive. It uses machinery for water pumping; computerised drip irrigation and fumigation systems; mechanised greenhouse systems; pre cooling and cold storage; and grading and packaging. This technology makes the industry globally competitive – but means that flower farms incur high energy costs for either grid or diesel-supplied electricity. Their energy needs and operations offer high potential for the use of low cost and flexible alternative energy sources, in particular solar energy.

Solar PV can be used to power Variable Speed Drive water pumps (VSD-pumps), which are flexible to changes in current and thus adaptable to solar radiation fluctuations. Most of the borehole pumps are also solar specific. Cooling and refrigeration is another area where solar PV is well adapted, in particular since cold rooms are mostly used during the day. There are also hot water requirements especially in farms with propagation units; here, solar thermal presents

an opportunity for preheating water for the boilers and also temperature increase in the propagation greenhouses. Solar can also be used for water processing, lighting and powering office appliances among other uses – in other words, it is a good match for the floriculture industry.

ASD has long recognised the potential for renewable energy in agro-processing, and has embarked on a programme to help the agricultural sector shift to solar where it's most applicable. Currently, together with French firm Urba Solar, ASD is conducting a DEGINVEST-funded solar PV/thermal feasibility study for four flower farms and one juice maker in Thika, Kitale and Naivasha. ASD is carrying out the energy audits and system design while Urba Solar is the EPC quotation provider.

To determine feasibility of solar for these sites, we identify the farm's energy needs through a detailed energy audit, quantify the solar energy potential at the site, and identify potential energy saving opportunities. After sizing the capacity, we examine project financials and propose to the client a likely payback period and internal rate of return. Most farms are interested in solar PV grid connect

embedded to their systems without batteries.

It is increasingly clear that solar PV and thermal technologies can offer flower farms an affordable source of energy for their operations – especially if they replace expensive diesel gensets. High quality converters also make PV electricity easier for the grid-tied systems. It's practical, too: PV modules can be either ground mounted or roof mounted, and most farms will have this space available.

Some flower farms have already taken the lead, with Tambuzi in Nanyuki being the latest to install a 60kW solar system in their farm where they're already reporting a saving of between 8,000kW and 10,000kW on monthly bills. This indicates adoption of solar energy is an option worth every farmer's consideration.

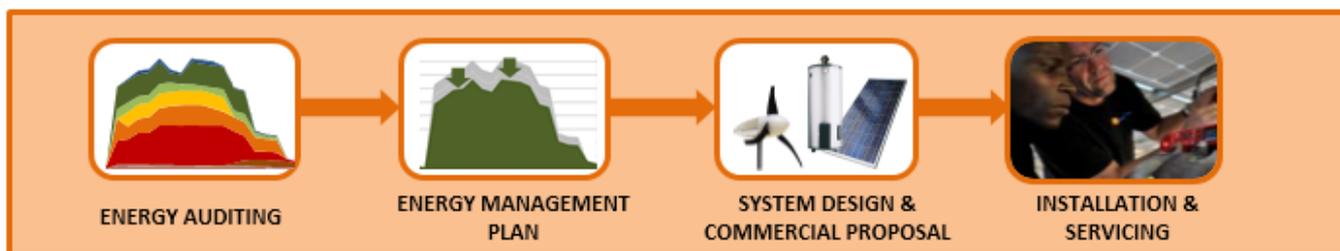
Contact us and we'll be happy to help you join the league of solar powered farms such as the ones shown below.

Farm	Size
Timaflor Ltd	100kW
Uhuru Flowers	72kW
Tambuzi Farm	60kW
Kitumbi Tea Factory	15kW
Williamson Tea	1MW

Nuggets – follow [@solarkkenya](#) on twitter

1. [Engel Green Sees Africa as 'Next Big Place' for Renewables](#)
2. [First major East African investment into off-grid PV. Ongera Solar City & Off-Grid Electric!](#)
3. [Uganda's Newest Utility: Pay-as-you-go Solar Power](#)
4. [Check out the AEEP 2014 Status Report about EU-Africa energy programme](#)
5. [Power connection charges go up in Kenya](#)
6. [Will the Electricity Grid Become Optional?](#)
7. [Ground breaking report sheds light on retail in Africa](#)
8. [Residential solar PV will also have a future in urban Africa. Need to start thinking about it.](#)
9. [Solar panel in classroom will light up regional education](#)
10. [Spotlight on Africa: Renewable energy projects hold promise](#)

ON THE LOOKOUT: Reducing Energy Cost through Efficiency and Conservation



From diagnosis, prescription to treatment: helping lower the electricity bill

The cost of power is every producer's worry. High electricity bills are affecting businesses around the world and have been forcing companies to embark on energy saving programmes to cut cost. Energy management is an area likely to keep growing. Recently, for example, Google spent USD 3.2 billion – more than double what they spent to buy YouTube – to buy a thermostat company, just showing the kind of interest this field is gaining.

Here in Kenya, high electricity bills have been pushing up the cost of doing business, with companies spending up to 40% of their operation cost on electricity. This is making companies turn to energy efficiency and conservation, even as lobbying to bring down the cost of power continues. The country's energy wastage is said to range between 10% and 30% of the primary energy supply. An energy audit is necessary to identify the saving potentials.

Of late there has been a growing campaign from both government and private sector to promote energy audits. The government has passed the Energy Management

Bill of 2012 requiring licensing of energy auditors and their firms, and donors are funding energy audit programmes such as the Centre for Energy Efficiency and Conservation, which is hosted by Kenya Association of Manufacturers (KAM) and supported by DANIDA, GIZ and the Kenyan Government.

At ASD we have been actively involved in energy audits for many years, with over 25 public and private sites undertaken.

40% - Percentage of operation cost some companies are spending on electricity

We've learned a lot during this time, including how inefficient some systems can be, costing owners thousands each year. We've visited an off-grid tourism site that is using diesel generator to heat water, and in doing so spending thousands of shillings every month on fuel that could be saved by using a solar water heater. Though some energy savings mechanisms come with an upfront cost there is likewise potential to reduce power costs with very little investment.

An energy audit is designed to map out current and future energy

needs and practices, and identify areas for conservation and efficiency. It looks for ways to reduce the amount of energy input into the system, without negatively affecting the output. Savings opportunities may come from boilers, process heaters and coolers, lighting, air conditioning and various other appliances.

ASD goes into an audit "technology neutral" – our objective is to work with each client's specific situation,

budget and needs to identify practical solutions. An energy management plan recommends efficiency measures (such as use of efficient appliances) and also alternative technology options to reduce fuel costs (such as solar PV and thermal applications).

With more support in financing, energy management presents a great opportunity for the manufactures and other producers to cut down their power cost.

About This Newsletter

RE Trends East Africa is a quarterly newsletter produced by ASD in a deliberate move to share its knowledge and expertise of the East African region that spans over 25 years. We cover emerging innovations and technologies and showcase energy trends in the region to paint a picture of the sector and the direction it is taking. At ASD we provide a range of technical, consultancy and capacity building assistance in the renewables sector.

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