



Nikhil Shah and Rushab Haria

# ILLUMINA – TING

## Kenya's Road To Power

Kenya is blessed with incredible amounts of renewable energy resources including solar energy, which is expected to see an increased uptake among consumers. Riding on this wave is Illumina Africa Limited, a solar services provider that installs solar powered systems for residential markets and businesses in Kenya. The co-founders of the company, Pulkit Shamschery, Rushab Haria and Nikhil Shah spoke to The Asian Weekly about their business model and prospects for the market.

By Simon Muli



Pulkit Shamschery

### Let's begin with a brief introduction of Illumina Africa.

**Nikhil:** Illumina Africa Ltd was incorporated in 2016 and is based in Nairobi, Kenya. We currently have two main operating business units – the Energy Unit which includes Solar Water Heating and Solar Electric (PV) for rural, residential and commercial applications and the Agriculture Unit, which involves drip, hydroponics and aeroponics solar-powered irrigation. The company's Energy unit aims to provide a custom-designed solar energy solutions (Water heating or PV electric) to satisfy the needs of our customers. Our system-level model, coupled with an optimisation algorithm that we continuously improve on, aims to achieve the most appropriate solution at the lowest initial investment, with the fastest payback period. We make going green, achieving energy independence while saving money very easy. The Agriculture Unit aims to provide low cost, low power optimised energy and water efficient solutions to all farmers' needs (small or large).

### Individually, do provide a brief background of yourselves how you ended up in this sector?

Pulkit Shamschery is the Chief Technology Officer (CTO) at Illumina Africa Ltd. He did his Undergraduate and Master of Engineering in Mechanical Engineering at Trinity College, University of Cambridge, UK in 2014 and Master of Science in Mechanical Engineering from Massachusetts Institute of Technology (MIT), USA in 2016. His Master's research at MIT focused solely on solar powered low cost energy-efficient drip irrigation systems for small hold farmers. Rushab Haria, the CEO and head of finance, studied at the Sauder School of Business in UBC, Vancouver. He graduated in finance and is currently a third level CFA candidate. He has worked for one of Canada's largest banks by market cap, CIBC, doing Mid-Market Credit, leveraged finance and M&A. Inspired by stories of business icons such as Elon Musk, he left his job to co-found Illumina with Pulkit and Nikhil Shah, the Director of Operations of the solar energy division. Nikhil completed his A level education at Hillcrest Secondary School before moving to Manchester, England in 2010 for his Bachelor's degree in International Business. Upon graduating, he acquired experience in different fields such as project management, operational efficiencies, product development, while also having a keen eye and interest for design.

### What makes your solar solutions unique in the market?

**Pulkit:** Its competitive advantages include, but are not limited to the technology, quality and knowledge. In technology, our inbuilt design algorithm and system level model combines data analytics, your load analysis and a genetic algorithm (a heuristic optimisation algorithm) to custom design a solution that optimises for your

needs while reducing the initial investment and increasing the rate of return. We have a system-level model for both, energy and irrigation. For quality, we source sustainably-manufactured panels which have high efficiencies. Environment is at the fore of our values; we don't compromise. We source charge controllers, inverters, batteries and accessories of the highest standards and quality. Simply put, we deliver the best solution with no compromise. As for knowledge, we are students of innovation, research, creativity and knowledge. We are always learning, improving and delivering the best solution. To avoid stagnation, we are flexible and adaptive to new advancements in technology. We are well versed with next generation solar panels, solar tiles and lithium and other chemistry energy storage devices and would implement them once the technology is slightly more mature and makes economic sense.

### You talk about lower utility bills; how much are you we referring to, considering Kenyan consumers pay an average of about 19 shillings kilowatt-hour?

**Rushab:** For PV electric, it will be between four to eight shillings per kilowatt- hour. It is a range based on the energy needs and custom design solution for each client (mainly the size of system and energy storage needs). The assumptions, backed by research, are that the average irradiation resource of Kenya is 1550 kilowatt-hour/ annum/kilowatt installed capacity and the solar energy system is functional for a minimum of 25 year and more. When considering solar water heating (water heating, on average, accounts for half the electric bill), the payback on the initial investment is between one and three years lasts over 25 years. It's free once paid back for. Solar energy solutions in Kenya; with an average insolation of 4-6 kWh/m<sup>2</sup>/day and high average per unit (kWh) costs from the grid, is perfect. Not only is solar technology advancing in terms of efficiency, but the per-watt installed cost is reducing exponentially.

### African countries represent less than 1% of the market demand for solar energy, despite the global viability and growth in the solar energy market. What is holding the solar energy sector back?

**Nikhil:** There are a range of factors that affect this adoption. Illumina's experience and other studies identified four categories: an enabling environment, access to finance, awareness and access to technical support

services. An enabling environment mostly refers to a government or regulatory bodies support or hindrance of a segment. A positive/support in the Kenyan sense would be Kenyan government's import duty and VAT exemption which applies to all solar equipment (excluding accessories) and the Energy (Solar Water Heating) Regulation 2012. There is a lack of technical knowledge and adept technicians. We are tackling majority of these issues by our awareness drive through old school pen-paper and school techniques as well as social media. We vet our technician and train them such that they have above average solar knowledge and intuition. And we are working on innovative ways to provide access to financing.

### A new solar water law (Energy (Solar Water Heating) Regulations 2012) requires all households with hot water requirements exceeding 100 litres be installed with a solar water heater. What does this law mean in your perspective?

**Nikhil:** This regulation was passed in 2012 but was only strongly enforced once the time frame stated in the regulation was coming to an end. We are glad the Kenyan government had the foresight in 2012 to implement such a policy. As has been previously mentioned, Kenya has one of the best solar insolation resources in Africa, hence, it never made sense to use the grid to heat water. It should be noted that water heating on average accounts for 50% of an urban electric bill. Thus, the policy is not only a great initiative to create sustainable and renewable value, decrease the load on the grid so that excess energy can be used for industrial growth but also enforces companies and individuals to save a lot of money in the long term.

### How do you ensure consumers comply with this law, now that the grace period has been pushed to November 2017?

**Pulkit:** Through our access to information campaign, we are not only trying to educate consumers of the implication this law, but also educate them about the benefits and potential use monetary savings in the future. We aren't a government or police agency that can enforce laws, policies or rules, but we are enablers. We enable consumers comply with the law through installs and education.

### Finally, the company began operations this year. Where do you see yourself in five years?

**Rushab:** Our five-year plan is to be the leading solar energy provider in the residential and commercial market and the rural electrification market, mainly through decentralised micro or mini- grid. As for our agriculture business unit, we would like to be market leaders as solar irrigation provider for large and small holder farmers, mainly in the drip, hydroponics and aeroponics market.

