

Abstract

This project sought to design and build a low cost solar photovoltaic roofing tile prototype by incorporating photovoltaic cells into roof tiles. Such tiles have the potential to provide robust and distributed electricity contained within the construction industry.

70% of the African Population lacks access to clean affordable and sustainable electricity. This is more than 620Million. Kenya is no exception and requires 15,000MW of power to power our Kenyan 2030 Vision. So far and for the last 50+ years we have only managed to generate 2,295MW which is just slightly above a tenth of the required power. The Kenyan government is also pushing for an immediate milestone of 5,000MW by 2017 in a bid to keep up with anticipated development goals.

This power is mostly generated from hydro, geothermal, wind, diesel, and now coal and nuclear is envisaged as well in another 10 years among others. We also have instances of solar energy but only insignificant generation bearing in mind the fact that we benefit from solar emission in perpetuity (*i.e.* more than 11 months a year in our Middle East and Africa, MEA region).

Solar energy is a naturally occurring and God given clean energy resource available all year round and which we need to exploit in a big way. A Massachusetts Institute of technology Research depicts that that the amount of energy emanating from the sun at any one time can power 5,000+ similar earths like ours. This paper seeks to open a way to close this dichotomy of too much solar energy availability yet the region is the most energy poor, we expand the shareholder base of power generation even to the common homeowner.

The unique value proposition is to ensure that every household produces more than twice (2x) its usage capacity consequently the already existing power generation is deployed to other industrial and commercial usage to avoid power rationing and to lower the tariff by increasing supply, thereby releasing our Kenyan and East African industries to grow in leaps and bounds, seeing power shortage is one of the largest de-motivator.

Successful rollout of such solar tiles will result in the homeowner, having more than enough energy for their needs and instead of paying their power bills they get compensated for all the extra power that the sun has generated for them. A significant social economic benefit and thrust will be ensuring

that specifically the lower middle income and poor part of the population also harbour a base income to cover their basic needs from income generated by selling surplus power.

The longer term objective and at a macro level is to expand our economy broadly by ending energy poverty, improving on both our environment and the populaces health by discouraging other non-renewable energy sources and providing extra purchasing power from extra electricity sales through net-metering, thereby presenting another opportunity for individuals unique contribution to build both their livelihoods as well as the national and regional economies without the pressure of meagre hand to mouth earnings in tandem with the Sustainable Development Goals (SDGs) ratified in Paris in 2015.