

# **Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion**

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

## **The Origins of an Idea**

For quite some time now, I have been scouring the ideas landscape for a set of transformative technologies and associated industrial value chains that have the capability to enable the economy of the African continent to charge ahead at double-digit rates over the next fifty years, which is the absolute minimum required if the continent is to succeed in shaking off the destructive forces of poverty, hopelessness and despair, whose signs are already here for all to see.

It has finally dawned on me that such technologies and the industries they will spur must belong to the future rather than the past if they are to have the effect we seek, which is to bring about radical change in the livelihoods of Africans by creating jobs for millions of the continent’s young population, by causing a momentous change in industrial and individual productivity across all manner of human endeavours and all the while, keeping the continent’s environment and bio-diversity safe. In other words, a 21<sup>st</sup> century industrial revolution right here in Africa.

It sounds like a tall order but it is not only possible, it is the only way forward for Africa, as I will explain shortly but first let’s take a close look at the state of the continent.

## **The State of Africa**

The developed world, led by USA, Europe, Japan, the emergent nations of South East Asia, India and South America – in other words the rest of the world; is powering ahead into the bright new future where Nano-technology is king, 3-D printing is the new way of manufacturing goods and outer space is the new frontier for the 21<sup>st</sup> century tourist. The developed world may be facing its own set of challenges, not least those caused by the global economic slowdown that started with the 2007 global financial crisis and the spectre of endless wars, but they pale in comparison to the challenges facing Africa and its people.

The commodity boom that propelled Africa’s economic growth during the past thirty years ended almost as abruptly as it began two years ago and although the end was not unexpected, it has caught most Africans unprepared and unable to adapt quickly enough to their new circumstances. It is not the first time Africa has experienced the end of a

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

commodity boom, but it seems that the continent has never been a particularly good student of history.

The Angolan president declared his country bankrupt a few weeks ago, in itself a shocking and unprecedented event given the amazing wealth and double-digit growth that the country experienced not so long ago. Other resource dependent economies such as Nigeria, Ghana and Zambia, that along with Angola were Africa’s shining examples of economic growth and prosperity during the last two decades, are now visibly struggling to stay afloat with all indications being that things will get much worse before they get better. And although Africa’s second biggest economy South Africa remains the most modern economy in Sub Saharan Africa, its growth is being overwhelmed by the demands of its young and fast growing population.

According to a report published in April 2016, eight out of ten hungriest nations on earth are African and they include Zambia, that no so long ago was declared by the World Bank and IMF as having attained middle-income status.

- Africa’s share of **global trade** for example is around 2% today, down from 3% thirty years ago. Compare this dismal trade performance with Africa’s share of the world’s population (15%) or its share of usable commodity reserves (estimated to be as high as 40%).
- **African agriculture** that is responsible for a big chunk of the continent’s GDP has failed to modernise, remains largely in the hands of subsistence farmers and hence incapable of creating meaningful jobs or production. Africa today lives off imported food (83% of all processed food consumed in Africa is imported and recent studies have shown that more than 70% of the tilapia fish consumed in East Africa, the indigenous home of the species, is now being imported from China). Compare this with Africa’s share of arable land (25%) and its share of fresh water resources (the African great lakes alone account for more 29% of the fresh water available to all mankind)
- The much talked about **demographic dividend** that economists have repeatedly predicted has not materialised, mainly because most of Africa’s young people are unemployed or unemployable.
- To make matters worse, Africa has de-industrialised during a period when other nations have intensified their industrial output.
- Worryingly, this has come at a time when the population of the continent has crossed the one billion mark and at 2.8% p.a., it is growing faster than any other population group in the world. Credible statistics claim that between now and 2050, Nigeria alone will add more numbers to the world population than any other country

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

in the world and the total African population is projected to grow from 1.1 billion today to 4.2 billion by the year 2100.

- Last year, Sub-Saharan Africa produced 19 million first time job seekers in a market that creates less than 500,000 formal jobs every year. This figure is projected to grow to 27 million by the year 2030 while Africa’s capacity to create new jobs is at best, expected to remain the same if we continue down the current path.

***This makes Africa a uniquely intriguing economic development case study.***

## **A ticking time bond needs diffusing**

As said earlier, the developmental gap between Africa and the rest of the world is widening very rapidly and thanks to modern technology, millions of young Africans are able to see that they are indeed falling behind, a situation that has led to frustrations, social tensions, breakdown of law and order and even wars. This is necessarily so because the continent remains an integral part of today’s globalised, interconnected and interdependent world.

Unable to find economic opportunities at home and left without hope of a better future, young Africans have taken to migrating to places where they hope to find a better life. Thousands of young Africans have perished while on the perilous journey across the Sahara and the Mediterranean to Southern Europe. Many have landed in the hands of brutal human traffickers who prey on desperate people in Africa and other poor regions of the world. Those who remain at home are quickly becoming part of a ticking time bomb that mass unemployment creates in all societies.

Speaking at the Tana Forum for Peace and Security in Africa in April this year, the President of Somalia said that none of his citizens under 30 who grew up in Somalia have ever seen the inside of a classroom and the only way they know how to make an income is by the gun. He must have been talking about more than 70% of his country’s population. Similar conditions exist in numerous African countries.

## **Climate change is not only real, it is deadly for many Africans**

The effects of climate change, aggravated by large scale deforestation, overgrazing and poor response to floods and droughts; is eating away at the continent’s productive soils, drying its rivers and lakes and turning Africans into hungry and desperate people.

## **And the city offers no respite from poverty and despair**

And our cities are bursting at the seams due to relentless urban migration. The city of Lagos in Nigeria for example grew from 300,000 residents in 1950 to an estimated 25 million in

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

2015, but the supporting infrastructure build has lagged behind, turning the city into a difficult place to live, and that is putting it mildly.

***Very clearly, Africa is engaged in a life and death fight for survival and relevance in this 21<sup>st</sup> century, a fight we cannot afford to lose.***

## **What Comes before an Industrial Revolution?**

I suggested earlier on that Africa needs nothing less than an industrial revolution kick off its transformation in this 21<sup>st</sup> century and this is what I mean:

Economic historians are in agreement that the onset of the Industrial Revolution in Great Britain 250 years ago is the most important event in the history of humanity since the domestication of animals and plants. The vital lesson we can take from the historic events that marked the industrial revolution is that any transformative wave of economic change is almost always set in motion by the discovery of new, more powerful, widely accessible source of energy; the kind that is capable of radically changing the manner in which production is done and consequently, the speed at which economic growth can occur.

It is important to note that the industrial revolution was powered by the famous steam engine. Infrastructures such as railways, roads, and canal transport systems radically transformed productivity and paved the way for the next wave of industrialisation and rapid economic growth across Europe 80 years later.

There is no doubt however that without the discovery of steam power, the revolution would not have been possible.

## **The right industries at the right time**

In recent years, a good number of African leaders, the United Nations Economic Commission for Africa (UNECA), the World Bank and many respected economic think tanks have proclaimed industrialisation as the newest imperative for the development of the African continent. I agree with them but at the same time, I note with concern that none has taken the trouble to seek the discovery of a new source of energy that Africans will need to

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

succeed. Existing power generation models are inaccessible to the majority of Africans, too expensive even for the rich, too ineffective and too harmful to the environment.

Another concern I have is that the proponents of industrialisation in Africa have not yet identified industries that have true transformative potential. Many are instead hoping to go 250 years back in time to pick up textiles, cement, glass, mining, leather, pharmaceuticals, construction materials, farm implements and other basic industries of a long gone era to transform Africa’s economies today. This I am afraid will not work.

There is a saying that goes: **“It is possible to drive forwards by using the rear-view mirror but it is difficult, and chances are you wont get far before something terrible happens”**. It follows that in order to develop; Africa must look forward not backwards, but that doesn’t mean we should not learn from history. As a mater of fact we should do so with all the seriousness it demands.

Let’s remember that textiles were the first major industries of the industrial revolution era 250 years ago. Along with them came metallurgy, machine tools, chemicals, cement, glass, paper machines, mining and many more. The agricultural revolution also took off at around the same time as a result of early innovations coming out of the new factories of the industrial revolution era.

Most of these legacy industries are still around today and they retain some economic relevance, but the world we live in has changed beyond recognition since then.

For starters, globalisation has changed the way people and states engage with one another, technology has transformed the way we work and produce, the African population has grown ten fold in the last 250 years and the distribution of wealth has become even more uneven across the globe. These changes are a fact of life but also they represent a source of numerous tensions and challenges.

The only thing that has not changed throughout this period however is the place that Africa occupies in the global food chain, namely the lowest and worst.

# **Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion**

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

We can in all seriousness not expect to transform African lives by trying to build industries that saw their heyday 250 years ago. It is also a fact that technological advances, in particular the automation of machines have made these industries so efficient and so independent of human intervention today that despite the utility of the goods they produce at extremely low cost; they clearly no longer have the transformative power they exhibited during the industrial revolution era.

Africa must therefore take the search for new ways of working and producing to a more ambitious, bolder, even audacious level. It must do so in ways that have never been seen before. Africans must be brave, courageous, self confident, determined and disciplined.

***We must find the 21<sup>st</sup> century equivalent of the steam engine and textile industry.***

## **Africa’s problems are unique, so must be the solutions**

In order to succeed in the new age of global over-production of literally every imaginable product characterised by technological disruptions at a frequency of a dozen a day, Africa must identify innovative ways of addressing the many challenges it faces especially those that are hindering the continent’s economic growth. First and foremost, Africa must radically improve its productivity by tapping into an energy source and associated industrial value chains for which it has unique competitive advantages on a global scale, where Africans can at once be significant if not the biggest producers and consumers of the goods they produce and their impact on the environment is sustainable.

## **A new attitude is needed; a new mind-set is vital for success**

It is said that adversity is the mother of invention. This unfortunately has not been true for Africans in recent human history. We have more often than not, reacted to adversity by resigning to our circumstances or looking elsewhere for help. We have not invented much let alone invested seriously in innovation and this attitude has over time become embedded in our character as a people.

- For example, we find it normal to react to hunger and mass starvation by calling for assistance from the UN rather than inventing new farming technologies, managing our environment better, including family planning, better healthcare for our citizens and better education.

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

- We react to economic hardships and unemployment by sending our desperate young ones across the Sahara to search for a better life in Europe instead of creating jobs right here in Africa.
- When we fail to balance our budgets, which is often, we ask for loans and grants instead of adopting a stricter approach to budgeting, pushing ourselves to produce more and living within our means.
- The fact that in 2015, Africa accounted for 85-90% of all malaria fatalities in the world (most of them children) says a lot about our attitude towards adversity, because the disease is preventable and treatable but it has found in us a people who when pushed, easily resign to their circumstances.

This needs to change urgently and the time for change is now.

The 21<sup>st</sup> century can be an African century if we have the courage to seize the opportunity that lies before us. This opportunity is real, it is huge and despite all the good news that has been reported out of some African capitals in recent years, our condition as a continent remains uniquely precarious; which for a change should push us to react differently and confront that adversity with fresh ideas, innovations and solutions. That is why we must urgently change our mind-set and radically transform our attitude as citizens of the world.

Our leaders in particular, must recognise the significance of this moment and provide the leadership we desperately need at this time. Throughout human history, leadership has always been critical in determining the fate of societies. It is more vital than ever now if Africa is to survive. I have a few ideas on how we can accomplish this task.

- We can start by declaring that we Africans are ready to shed the label of ‘consumer’ of things we don’t make, the label of ‘non-contributing participants’ in the global food chain.
- We will need to find the confidence to say that we Africans can do what the best in the world can do, that we can be makers of things
- We will do so by recognising that making marginal profits from the sale of our natural resources assets will not change our fortunes in a sustainable way. Instead, it is important that we learn how to exploit them ourselves, add value, manufacture, consume and sell excess finished goods to those who need them.
- Africa must strive to rediscover the pioneering spirit that led to the creation of the oldest university in the world in the city of Timbuktu, Mali in the 12<sup>th</sup> century, the same pioneering spirit that produced countless inventors and makers of machines and consumer goods in the West five centuries later.

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

- Africans must prepare themselves to assume total control of their destiny in order to reclaim their place in history and in the world economy
- Africans must proudly contribute their fair share of economic output that is needed to sustain humanity
- Africans must eschew foreign aid as a development tool
- Africans, particularly African leaders, must muster the courage to lead the world, not because it sounds nice but because the world needs Africa’s leadership today more than ever before.

I believe our efforts must therefore be directed at finding the one thing, that value chain and energy source along with the associated technology ecosystems, whose transformative power is so great, its influence so pervasive, its economic impact so vast, that it will propel Africans to unprecedented levels of productivity, enabling them to steady the ship carrying its people into a brighter future.

It is clear to me that this value chain cannot be any run-of-the mill industrial activity. It is also clear that the role of Africans in this new value chain cannot be the usual one of prolific resources asset seller and proud collector of capital gains taxes.

This value chain will be new, it will by necessity be an industry of the future and the time for its discovery is now. That is what a pioneering effort looks like and the pioneer this time will be Africa.

## **Africa’s problems are unique, so must be the solutions**

In order to succeed in the new age of global over-production of literally every imaginable product characterised by technological disruptions at a frequency of a dozen a day, Africa must identify innovative ways of addressing the many challenges it faces especially those that are hindering the continent’s economic growth. First and foremost, Africa must radically improve its productivity by tapping into an energy source and associated industrial value chains for which it has unique competitive advantages on a global scale, where Africans can at once be significant if not the biggest producers and consumers of the goods they produce and their impact on the environment is sustainable.



# Africa is on the brink of a solar-powered industrial revolution – if the continent's leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

## Tanzania as a Future Global Capital of Renewable Energy Industries

In order to demonstrate how viable this idea (of an industrial revolution in Africa) is, I will turn to the one AFRICAN country I am most familiar with, namely my home country TANZANIA, a country blessed with immense natural resource wealth, a uniquely strategic geographic location and yearlong sunshine among many advantages.

Tanzania's known subterranean energy resources alone (+60tcf of natural gas reserves, substantial reserves of coal and most recently discovered, the type of graphite used in the manufacture of batteries for electric cars to mention only a few), combine to make Tanzania one of the wealthiest countries in the whole world, but only on paper and in theory.

For Tanzania to realize that wealth, we must find smart ways of taking those resources out of the ground, transforming them, maximizing value and using them for our benefit. The challenge however is that this cannot be done without substantial amounts of FDI and experience has shown that this FDI will only become available under two conditions:

1. FDIs will flow only when global market conditions are ideal, but we as a country have no control over that (see recent sharp drop in the global price of oil and how it has adversely affected the take off of Tanzania's much anticipated natural gas industry)
2. FDIs will come in if we agree to export resources in raw form in order to satisfy demand in global markets

This is definitely NOT the way to go and quite frankly, we have been there before.

Economists agree that the only thing that can move the economic growth rate in developing countries in Africa from the current average of 5-6% GDP growth per annum to say double digits of 13-18% that is required to take these countries to middle income status in our lifetime, is a sharp increase in productivity of the people and industries of Africa.

Throughout history, energy has proved to be the single most important enabler of rapid and sustained productivity increases.

Currently, Tanzanians enjoy about 100KWh/capita of electricity compared to 7,300KW/capita in France. As a matter of fact, France produces more electricity than all sub-Saharan African countries combined. The correlation between energy consumption and productivity (and hence development) is under no dispute.

It is also an established fact that with as many as 89% of rural populations and (66% of all Tanzanians) having no access to electricity at all and electricity supply growing at only a meagre 6% p.a.; and 70% of the investments in the energy sectors (70%) being financed by

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

aid money or expensive foreign loans, it is most unlikely that productivity in Tanzania or Africa for that matter can be impacted in significant ways if we continue along the same path we have travelled thus far.

## Africa’s steam engine moment

***The one industry that comes to mind for me as the most promising and transformative driver of positive change, one that has the power to radically change factors of production, influence new and sustainable patterns of consumption, lifestyle evolution and economics in Africa in the 21st century is renewable energy and in particular solar energy.***

Solar power is not only plentiful in our part of the world but it is also technically free of charge and environmentally sustainable. Hence the path to our goal of full electrification of Tanzanian households is made substantially easier, cheaper, environmentally safer and attainable in our lifetime.

***If well exploited therefore, solar energy as an industry can be Tanzania’s 21<sup>st</sup> century equivalent of the steam engine and textile mills of the industrial revolution.***

Use of solar power will keep the environment safe.

By embracing its benefits and crafting policies to encourage its use while making sure that extremely poor people are not left behind, Tanzania has the unique opportunity of becoming the world leader in the use of sustainable energy, environmental protection and growing its economy at fantastic rates.

## **100% electrification of the country by 2025 is possible**

It is estimated that TANZANIA will have a population of about 70m people or 14m households by the year 2025

Of these 70% (9.8m households) will have no access to electricity if we continue investing the same way we have invested in the energy sector since independence. The 9.8m households present both a problem and a great development opportunity.

We must choose the opportunity and aim to add 1,000-2,000 MW of solar power to Tanzania's energy pool by 2025, enough to give each of these rural households a minimum of 100-200W of solar powered electricity that can light up a home, a school, a health centre, power a new generation of low energy consuming home appliances (TV, fridge, irons,

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

kettles and even cookers, water pumps and heaters), power telecom networks and transform lives of millions of Tanzanians.

We can achieve this through an investment of \$1.5-2bn over the next ten years and a bulk of that money can be provided by private sector investors with government stepping in only to provide subsidies to extremely poor families that cannot afford the cheapest solar kits.

Tanzania’s noble but extremely expensive Rural Electrification initiative (in terms of dollars spent on connecting one user/household to the grid) can re-engineer its business plan and strategy by tapping into renewables as sources of energy instead of spending so much money building expensive grids that cannot be energized for most of the day.

## ***A 2-pronged electrification strategy***

With that rural energy need taken care of, the government can direct its investment dollars to what I call "**Industrial Power**", the kind that will be consumed by industries and cities. The proposed FYDP II has a target of increasing supply by 3,500MW by 2025. This can be done more cheaply, more efficiently and more sustainably.

## **Job creation on an unprecedented scale**

- The use of solar power and investments in pioneering renewable/solar manufacturing industries (solar technology devices, batteries for solar systems and electric cars, etc.; will create millions of meaningful jobs over many years to come.
- Experts estimate that by 2050, 90% of all Electricity consumed in Africa will be solar. That is the size of the opportunity
- The need to import oil (currently 40% of all imports into Tanzania) will be history.
- The environment will be safe and the lives of Tanzanians will be massively enriched.

## **In conclusion, let me say that**

- Renewable energy has been around for quite sometime now, so what I am proposing is not new. What has been missing however is the willingness to adopt it and the courage to implement the necessary policy reform that will enable the use of renewable energy to become mainstream.
- The suggestion that an industrial revolution will require a powerful and accessible source of energy is also not new. What is new is the proposal for Africans to engage more proactively and deliberately in the search and discovery of these new sources of energy.
- Another suggestion that is new is one that calls on AFRICAN leaders in particular to

# Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

see the natural resources under the soils of their countries not as immediately available assets for sale to the highest bidder. Gone should be the days when news of discovery of a new natural resource, be it helium gas or flake graphite, will be met by wild speculations over how rich we have suddenly become by auctioning them off, or worse, by using them as collateral for unnecessary loans.

- Instead, new discoveries should prompt us to plan new industries right here at home, to design new machines and consumer products that will improve the livelihoods of our own people by making our economy stronger.
- We must make a distinction between resource-seeking FDIs and market seeking FDIs and attract both strategically to meet the various needs of our economy.
- Most importantly, we must provide our people with appropriate education that will enable them to participate meaningfully in the emerging industries. We should create Local Content Units that will ensure transfer of knowledge and technology from foreign investors to the local population.
- We must understand that collecting capital gains tax on the auctioning of undeveloped resource concessions is in itself not a real achievement. The same goes for customs tax collected on incoming trade cargo that is not matched by outward-bound export shipments. This means we must become manufacturers.

Another tall order some may say but I know that in the sun, we have a natural resource that we cannot sell even if we wanted to and it is there for all of mankind to use at will.

Indeed I have a vision of Tanzania as a hotbed of renewable energy innovation and mega industries in my lifetime. That is why I am investing my own money in this sector. It is for the same reason I am working hard to convince many others, foreign and local, to invest in renewable energy in our part of the world.

I believe very strongly that we in Tanzania can own this revolution by embracing solar and other forms of renewable energy, by changing our mindsets and by adopting a new attitude towards our role in the world.

And I hope that our leaders will rise to the occasion and provide the kind of leadership we need to succeed.

**Let's get to work on Africa's Industrial Revolution**

# **Africa is on the brink of a solar-powered industrial revolution – if the continent’s leaders can rise to the occasion**

*A Think-Piece by Ali A. Mufuruki – launched at the 2<sup>nd</sup> Germany-Tanzania Renewable Energy Summit. 11<sup>th</sup> July 2016 4<sup>th</sup>*

---

Ali A. Mufuruki  
Dar es Salaam – 11<sup>th</sup> July 2016