

## Electric two-wheelers in Africa? Markets, production and policy

Anthony Black,<sup>i</sup> Justin Barnes,<sup>ii</sup> Brian Makundi<sup>1</sup> and Tobias Ritter<sup>1</sup>

*This is a summary of the paper “Electric two-wheelers in Africa? Markets, production and policy”, presented at the conference “Green transformation and competitive advantage: Evidence from developing countries” taking place in Bonn, June 2018. It has been selected as one of the most policy-relevant papers.*

### Introduction: Electric two wheelers in developing countries

The internal combustion engine (ICE) remains the dominant vehicle technology globally but electric vehicles (EVs) and especially two-wheelers are making rapid headway. China, which has proactively promoted electric technology through a series of far reaching policies, had some 200-230 million electric two-wheelers<sup>iii</sup> already in use by 2015 (Altenburg et al, 2017). Penetration is much lower in other major motorcycle markets such as India, Indonesia and Vietnam but is growing rapidly and is being increasingly supported by government policy (Bloomberg, 2017).

In Africa, current levels of motorization are still exceptionally low and electric vehicles are almost non-existent. Nevertheless, the conventional motorcycle market is growing rapidly and with rapid economic and population growth, this market expansion is set to continue.

Two sets of questions then arise in the African context. Firstly, why is the penetration of electric two-wheelers so low and how rapid will the take up of these vehicles be? Secondly, where will these vehicles be produced – will they be imported as is currently the case with conventional two-wheelers or are there prospects for domestic manufacture? And if markets and

production are going to expand, how could this be achieved?

### Two-wheeler transport, markets and production in Africa: The case for going electric

There are very striking differences in the level of usage of motorcycles between countries in Africa. For example, in South Africa usage is very low, while just to the north, in Angola and Mozambique, motorcycle densities are high. There are also striking contrasts in West Africa, for example, between Nigeria with relatively high densities in urban areas and Ghana which has low densities. And sales are growing rapidly. In 2015, imports of motorcycles into Africa amounted to \$1.86 billion, representing 9.9% of global motorcycle imports. Nigeria alone imported motorcycles worth \$447 million. But electric motorcycles are hardly in evidence and there are no policies to promote them.

However, given that approximately 25% of the global market for two wheelers is already electric and that this share is growing rapidly (Altenburg et al, 2017), there are significant opportunities for Africa to shift towards electric technology. Given the fiscal constraints faced by African countries, the question then arises as to the extent that they should invest in the

The conference was organized with financial contribution from:

adoption of new emerging technologies, or simply follow market dictates as latecomers in the sector.

A strong argument can be made to promote the emerging technology because the use of ICE technology is set to decline rapidly in the medium term (Bloomberg, 2018). In China, India and other major motorcycle producer countries, the promotion of electric motorcycles is being driven by three main factors. The first of these is concerns about urban air pollution in major cities. Secondly, countries such as China and India but also Vietnam and Thailand, see the promotion of electric vehicles as part of a deliberate strategy to develop competitive advantage in emerging technologies. A third factor, which is of great importance in India, is the bid to reduce fuel imports and improve energy security.

Electric vehicles offer the benefits of reduced urban air pollution and reduced CO<sub>2</sub> emissions, although the latter depends on how electricity is being generated. Africa's growing cities are experiencing severe and increasing levels of air pollution. Premature deaths in Africa resulting from air pollution (ambient particulate matter), while lower than in China, are rising rapidly. According to the World Health Organization, four of the worst cities in the world for air pollution are in Nigeria. An important contributor is transport. The OECD (2016) estimates the economic costs of air pollution to amount to as much as \$215 billion in Africa, including \$69.9 billion in Egypt and \$41.8 billion in Nigeria.

While it is clear that demand is currently very limited, electric two-wheelers potentially offer the opportunity of low cost mobility in Africa. The major constraint is, of course, the cost relative to alternatives.

Studies undertaken in India, show that maintenance costs are the main determinant of purchase decisions and these are already very low for electric two-wheelers (Bloomberg, 2017).

Battery costs come second and these are falling rapidly. The price of lithium-ion batteries declined by more than 70% from 2010 to 2016. According to Bloomberg (2018) they will fall by another 73% between 2016 and 2030. Charging costs are already low, and with the advent of smart grids, will decline further. Of course, this is some way off in many African cities, where the reliability and cost of electricity remains a problem.

### **The potential for competitive advantage in electric two-wheeler production**

The case for promoting EVs is much harder to make in developing countries if this equipment is to be imported. It is important therefore to consider the potential for achieving competitive advantage in this sector.

As part of a broader bid to industrialize, there is growing interest in a number of larger African countries in building some sort of automotive industry. But the difficulties of establishing reasonably competitive production are enormous. The automotive industry is scale intensive and even the larger economies such as Nigeria and South Africa lack domestic markets, which are of sufficient size to achieve economies of scale. A further problem is that most African countries suffer from weak manufacturing capabilities and poor infrastructure. While wages in Africa are generally low, when one controls for factors such as per capita income, living costs, firm size and sector this is not the case and South Asia and East Asia have a significant labour cost advantage.

Given that most African countries battle to compete in manufacturing, the argument for leapfrogging to electric two-wheeler production is therefore somewhat speculative. But four points can be made. Firstly, while the automotive industry is characterised by significant barriers to entry, motorcycles have offered a production entry point for a number of countries in Asia because the market has been

The conference was organized with financial contribution from:

large and the technology relatively simple. The same argument would apply in Africa.

A second and related point is that there are far fewer parts in electric two-wheelers and optimal scale is reached at a lower level of output. In China for example, there were some 2600 assemblers of complete electric two-wheelers in 2010 although 50 firms accounted for about half of this production (Altenburg et al, 2017). Linked to this are innumerable small-scale parts makers and suppliers putting together products which use quite low technology.

A third potential advantage, particularly in relation to other forms of automotive production is that the motorcycle market in Africa, unlike the car market, is not dominated by used imports, which currently seriously impede the possibilities for domestic car assembly. Fourthly, the lack of 'brown' assets in ICE technology can be an advantage for newcomer industries (and countries), which do not suffer the disadvantage of large depreciating assets.

## Conclusions and policy

A number of African countries are attempting to get into automotive production. Given the rapid worldwide shift to EV technology, it would be sensible to consider leapfrogging to electric technology, especially for two wheelers.

What policies are appropriate? National circumstances vary widely and the leaders are likely to be countries with large markets and ambitions in the automotive industry. These include Nigeria, Egypt, Ethiopia and Kenya. All have limited resources and limited technological expertise but supportive policies could include low cost measures to promote domestic demand for electric two-wheelers (lower taxes, marketing support and small subsidies). Indirect measures to boost domestic demand would include the elimination of fossil fuel sub-

sidies, clean air policies and Infrastructure support such as charging facilities. Support measures for production, could include moderate tariffs on imports of two-wheelers with some exemptions for components as well as appropriate innovation support.

The arguments set out above are speculative and require much more detailed investigation. But it is the contention of this paper that there exists an opportunity for Africa to leapfrog into emerging electro-mobility technologies in a product where the market is expanding rapidly and where the basic production technology is not unduly sophisticated. The successful production of electric two-wheelers may then offer opportunities for related industrial expansion in other types of EVs and related technologies.

## References

- Altenburg, T., Feng, K. and Shen, Q. (2017) Electric mobility and the quest for automotive industry upgrading in China. In Altenburg, T., Assmann, C. (Eds.) *Green Industrial Policy: Concept, Policies, Country Experiences*. UN Environment; German Development Institute/Deutsches Institut für Entwicklungspolitik (DIE), Geneva; Bonn.
- Bloomberg New Energy Finance (2017) India EV Market Seeks the Tipping Point. *Advanced transport – Research note*. April 20.
- Bloomberg New Energy Finance (2018) *Long-Term Electric Vehicle Outlook 2018*. May 21.
- OECD & International Energy Agency (IEA). (2017). *Global EV Outlook 2017: Two million and counting*. Paris: OECD/IEA.
- Entwicklungspolitik (DIE), Geneva; Bonn.

The conference was organized with financial contribution from:



Bloomberg New Energy Finance (2017) India EV Market Seeks the Tipping Point. *Advanced transport – Research note*. April 20.

Bloomberg New Energy Finance (2018) *Long-Term Electric Vehicle Outlook 2018*. May 21.

---

<sup>i</sup> School of Economics, University of Cape Town

<sup>ii</sup> B&M Analysts, South Africa

OECD & International Energy Agency (IEA). (2017). *Global EV Outlook 2017: Two million and counting*. Paris: OECD/IEA.

<sup>iii</sup> These included electric scooters, bikes and motorcycles.

The conference was organized with financial contribution from: