NIGERIA'S ENERGY TRANSITION PLAN REVIEW SERIES:

The Transport Sector

Clean Technology Hub
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FORWARD

This review was written by Chinwendu Obed under the guidance of Ifeoma Malo, Abel Gaiya, Desmond Dogara and Byencit Duncan. It was compiled using information from the Energy Transition Plan (ETP) official website as well as information from various stakeholder engagement within the E-Mobility sector and news reports.

List of Acronyms

Acronyms	Meanings
BAU	Business as Usual
BRT	Bus Rapid Transport
CAPEX	Capital expenditure
CO_2	Carbon Dioxide
CO_2eq	Carbon Dioxide Equivalent
E-Mobility	Electric Mobility
ETP	Energy Transition Plan
EV	Electric Vehicles
GDP	Gross Domestic Product
GHG	GreenHouse Gas
ICE	Internal Combustion Engine
NADDC	National Automobile Development and Design Council
NBS	Nigeria Bureau of Statistics
NDC	Nationally Determined Contribution

List of Acronyms

NNPC	Nigerian National Petroleum Corporation
PMS	Petroleum Motor Spirit
SMDF	Solid Minerals Development Fund

INTRODUCTION

Nigeria has heavily relied on fossil fuels as the primary energy source to fuel various modes of transportation, including 11.7 million cars, buses, and two- and three-wheelers. The country's demand for these vehicles is projected to further increase due to a growing population and higher per capita incomes.

This has directly and indirectly affected the emission of GreenHouse Gases (GHG) in the transport sector. From 1971 to 2014, the Nigerian transport sector contributed an annual average of 48% to the country's total CO2 emission from fuel combustion.[1] The transport sector in 2014 was responsible for 35.4% of total emissions[2], and is projected to increase to 50% by 2035 and eventually 100% by 2050 based on the business as usual (BAU) scenario.[3] By 2017, total emission from the transport sector was 38,477 CO2-eq with road transport the highest at 95.7% of the total emissions[4].

To help reduce carbon emissions and to improve the range of options and efficiency available to Nigerians, the Energy Transition Plan (ETP) makes provision for transformations in the transport sector.

THE TRANSPORT SECTOR

Road transport is the commonest means of transportation in Nigeria, and was the best performing sector of 2022 with a 56.38% growth in second quarter, which grew the economy by 3.54% in real terms.

With regards to the contribution of transport activities to Nominal GDP in second quarter 2022, the rail sector had suffered a decline of 37.90%, a decrease of 69.57% year-on-year. Air

[1] https://bit.ly/3NN8xpm
[2] https://knoema.com/atlas/Nigeria/topics/Environment/Emissions/CO2-emissions-transport-percent
[3] https://bit.ly/3NN8xpm
[4] https://bit.ly/3CLVTQQ

transport's contribution was 50.68% in the first quarter of 2022, compared to 22.45% recorded in the second quarter 2022, and water transport saw a decrease of 3.02% in the second quarter 2002.

According to the Nigeria Bureau of Statistics (NBS) Report in 2018, out of the 11.7 million vehicles, 4.7 million are private (40.67%); followed by government vehicles with 139,264 (1.19%); while Diplomatic vehicles account for 5,912 (0.05%).[5] This increased to 13 million by April, 2021.[6] The growth that the road transport brings to the sector is greatly linked to its status as the most common way of transporting people and goods. For users, road vehicles are more accessible and have greater ease of mobility. The sense and right of possession that comes with owning a passenger vehicle for an average Nigerian or family is also a link to the common usage of road transport.

According to the ETP, the transport sector is responsible for 24% of emissions off its focus sectors. This amounts to 43 MTCO2e.[7] In Lagos State, the transport sector contributes to 60% of the total emissions in the state. [8] Approximately 72% of national transport emissions in 2020 were traced to passenger vehicles, hence the focus of the ETP on a switch to low-emission transport technology and mode-shifting through its decarbonisation strategy. The ETP document illustrates a plan to reduce emissions in this sector by approximately 97% by 2050. The mode shifting approach to be taken by the ETP would reduce the use of passenger vehicles and increase the use of public transport vehicles. This would reduce the number of vehicles on the road as well as emissions produced by all of them. A typical mass transit system is capable of transporting an average of 50 to 80 persons at once; this is equivalent to an average of 26 to 80 passenger cars with an average of one to three persons per vehicle[9].
In 2022, two years after the launch of the first EV in Nigeria, Hyundai Kona, the country still recorded less than 1% of EV sales off the total sales of cars. The ETP has consequently

[5] https://www.nigerianstat.gov.ng/pdfuploads/Road_Transport_Data_-_Q2_2018.pdf
[6] **Ibid**
[7] https://www.energytransition.gov.ng/transport-2-2/
[8] https://bit.ly/3qOUO8b
[9] https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/mass-transportation-0

incorporated a realistic timeline for an EV full on rollout in the transport sector (post 2030). During the transition period between the adoption of e-mobility and the phase out of ICE, the ETP has envisaged the use of biofuels to balance and blend in these phases as an interim decarbonisation solution.

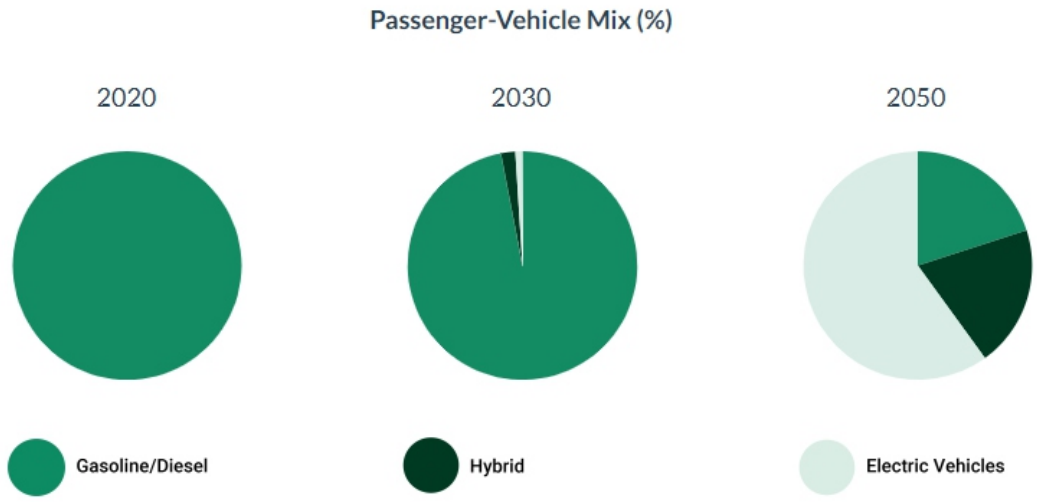

Figure 1: ETP projections for passenger vehicle mix until 2050[10]

ACTION PLAN

As previously mentioned, the ETP projects a 1.5% Compound Annual Growth Rate per year on the investment of electric vehicles after 2030, ramping up the market value of electric vehicles by 60% in 2050 and eventually scaling up to 100% of the market value by 2060. In the interim, the following are to be put in place, although several challenges exist:

- Mode-Shifting: Where a great mode to reduce passenger cars on the road is required, this cannot occur without a viable alternative. The number of mass transit buses in Nigeria is currently not high enough to absorb a significant share of the population. Aside from Lagos State and very few others, most Nigerian states do not have state-managed mass transit systems. For Lagos, although about 71.5% of the over 22 million

[10] https://www.energytransition.gov.ng/transport-2-2/

people in Nigeria's most populous and wealthiest state, Lagos, have been recorded to use the public transport system, the Lagos Bus Rapid Transit (BRT) currently serves an average of only 200,000 passengers per day.[11] Moreover, most of the mass transit systems in the state lack proper maintenance and modes of operation.

- Deployment of biofuels: The ETP plans to introduce a 10% blend rate of biofuels as a fossil fuel before 2030 which would eventually reach 30% by 2036. While this has been mentioned in the plans for Nigeria, there have been no effective implementation plans laid out by the government since the initial launch of a national biofuel policy in 2007 and the Nigerian National Petroleum Corporation (NNPC) championing biofuel development. With barely seven years until 2030, the ETP will need to work on every process to bring the biofuel market into reality in Nigeria.
- Post-2030 deployment of electric vehicle (EV) charging infrastructure (~ 3k stations/year): The ETP projects the activation of the EV market after 2030, starting with charging station deployment. For most consumers, the biggest fear for EVs in Nigeria would be the inability to charge batteries and getting stranded on the road. Making charging stations accessible like filling stations would create confidence for Nigerians. The ETP has incorporated the deployment of approximately 60,000 EV charging stations across the country, pushing for 3,000 deployments per year. However, this responsibility has not been placed on a particular government ministry or agency. Some argue that the National Automotive Design and Development Council (NADDC) which has led the development of a draft national EV policy does not have the capabilities to facilitate the deployment of charging stations at scale.

[11] https://brtdata.org/location/africa/nigeria/lagos

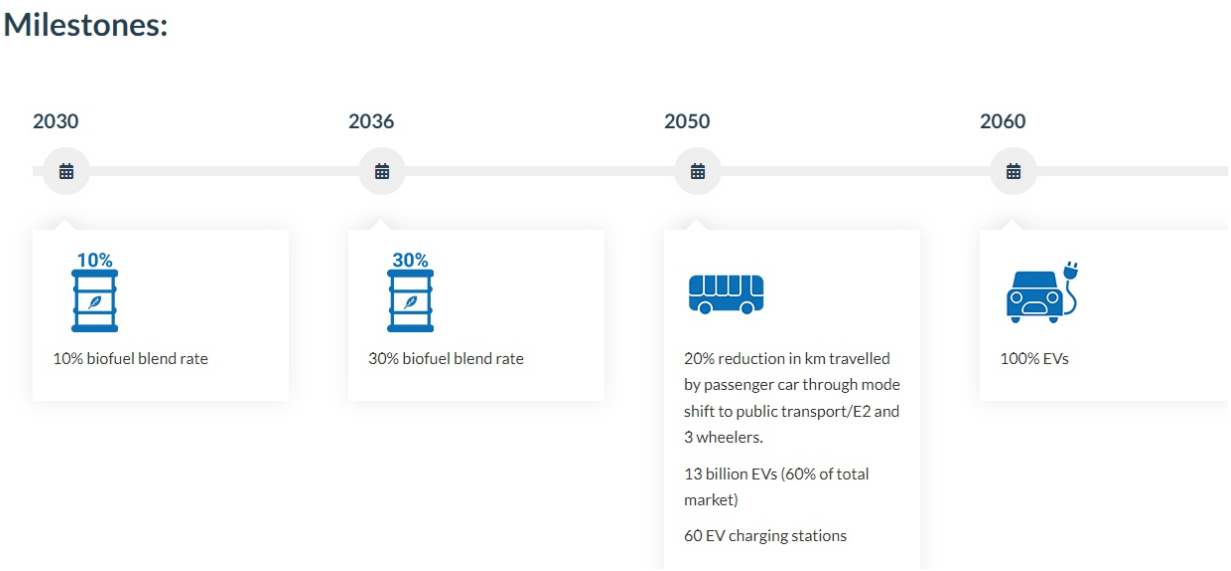

Figure 2: ETP Transport Sector Milestones[12]

FINANCE

With a total of over $1.9 trillion, a $410 billion above business as usual spending, the transport sector is estimated to cost $21 billion on capital expenditure (CAPEX) with a minimal differential between usual spending and net-zero spending. This is because EV technology is expected to reach cost parity with Internal Combustion Engine (ICE) vehicles at $8 billion before the majority of ramp up. In addition, the intended modal shift from passenger cars to buses and 2/3 wheelers is expected to reduce operational expenditure (OPEX).

However, compared to the ETP's elaboration on the power sector, not so much has been said about the financial plans and structure of the transport sector. No specific investments or funding streams have been mentioned. This could indicate a deference to the private sector to take the lead on financing the transportation transition.

[12] https://www.energytransition.gov.ng/transport-2-2/

JOB OPPORTUNITIES

The ETP has projected 340,000 jobs created by 2030 and 840,000 by 2050, of which the transport sector is expected to ramp up from 10,000 to 430,000 job opportunities by 2030 and eventually 2050, respectively. The primary mode of implementation in the transport sector is a mode shifting method. An increase in the use of public transport based on the mode shifting technique would require an increase in the number of mass transit buses, mini buses, two and three wheelers to accommodate the growing population. This presents opportunities for employment growth in the sector..

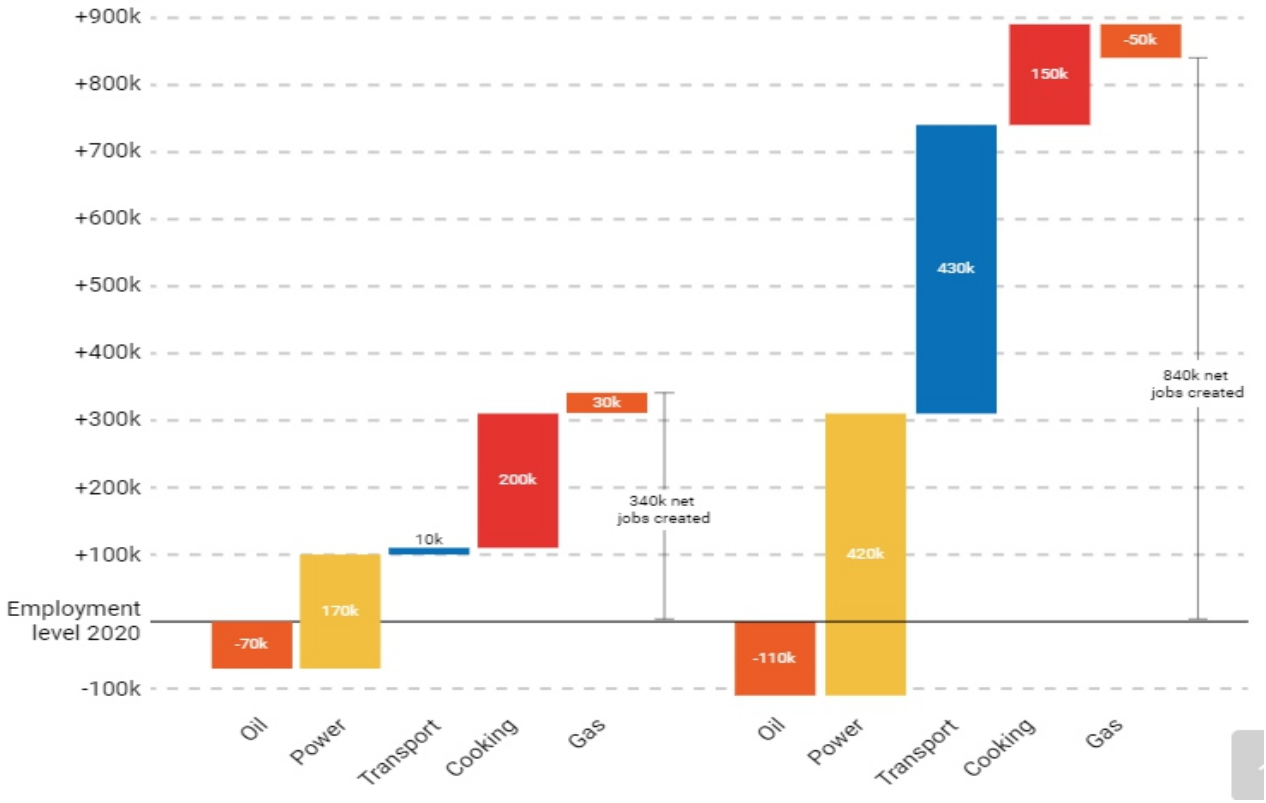

Figure 3: Net job creation projection for 2030 and 2050[13]

CHALLENGES OF DECARBONISING THE NIGERIA TRANSPORT SECTOR

1. Silence on hard-to-abate sub-sectors

While the coverage of the ETP in the transport sector is commendable, it is wholly focused on the road transport system. Hard-to-abate sectors such as aviation and shipping are not

[13] https://www.energytransition.gov.ng/transport-2-2/

included in the plan. Yet the use of aeroplanes has received significant attention in the last few years. According to the National Bureau of Statistics in 2022, there was a 45.32% increase in the use of aeroplanes, resulting in a total of 15.23 million passengers from 10.48 million passengers in 2021.[14] This inherently means the increase in the frequency of flights that take off on air. Due to the increase in demand, airlines in Nigeria have had to expand their fleet and await an additional 40 new aeroplanes over the next 36 months.[15]

2. Petroleum is the bedrock of Nigeria economy

Crude oil has been a significant part of Nigeria's economy for decades. Between 2017 and 2021, a total of $195 billion was generated from crude oil at an average of $39 billion per year.[16] The Nigerian government is also financed mainly from the oil sector, while the country's largest export earnings are from the sale of oil. The average fuel tank of a passenger car in Nigeria is between 50 to 60 litres. An estimated $22.8 billion, on a 4 million registered passenger vehicle scale. As an oil producer, the Nigerian government also subsidised Petroleum Motor Spirit (PMS) for decades. These factors contributed to the lag in the development of the e-mobility market in Nigeria compared to East Africa.

However, the European Union is set to ban petrol and diesel vehicles by 2035, which will take a toll on global demand for crude oil.[17] Moreover, the removal of fuel subsidies in 2023 suggests that the growth of the Nigerian e-mobility market is set to accelerate.

3. Lack of government support

The electric vehicle sector has existed without a working policy or financial scheme from the government. The ETP is the closest Nigeria has had to guidelines for the sector, but it is not elaborate in its provisions. This limits investment, for instance from charging infrastructure providers for whom the uncertainty associated with disparate charging ports and lack of

[14] https://bit.ly/45q0FRh
[15] https://bit.ly/3q1KJnX
[16] https://bit.ly/43iKjsp
[17] https://bit.ly/3pnUoFx

standardisation increases investment risks. The potential risk of investing in a sector with no guideline is the biggest fear for any investor.

4. Lack of support for EV manufacturing

There are currently no sector-specific incentives for EV manufacturing in Nigeria. This means that many electric vehicles are imported into the country. When they are locally made, batteries, which often account for the majority of component costs, are still imported. Moreover, due to the initial cost of acquiring an electric vehicle, the pace of switching to electric passenger vehicles would be rather slow, thereby prolonging the taking a longer timeframe to reach a net zero. The resale value of electric vehicles is lower because batteries have shorter life cycles than internal combustion engines (ICE).

To reduce costs, reduce import dependence and create local manufacturing jobs, the government has to provide adequate incentives for manufacturing EVs locally and for local battery production. These would include producer subsidies and demand subsidies.

RECOMMENDATIONS

- Nigeria needs to seize prevailing opportunities in EV research and global policy encouragement to expand its domestic EV market size. One exploratory field is the untapped lithium market for making batteries. States like Nasarawa, Kwara, Cross-river, Ekiti, Kaduna and Kogi have been identified as territories with commercially viable lithium in Nigeria. The Chairman, Board of the Solid Minerals Development Fund (SMDF) has identified the importance of lithium in the new energy economy, hence the need to develop intentional policies to control the exploration, exportation, mining and production of lithium in Nigeria.[18] The Board Chair has also called for the establishment of a special-purpose fund for the exploration of lithium in the country. It is great development that Nigeria is recognising the importance of creating and

[18] https://bit.ly/3OCQjYj

taking advantage of an EV value chain. The ETP should include this in its implementation plans for the transport sector.

- A working policy is the solid bedrock for the smooth progress and viability of a sector. No formed policy currently guides the e-mobility sector. Forming a strong collaboration between the implementing body for Nigeria's transport laws and policies, and ETP is highly recommended to fast track the new policy which the NADDC is developing for the transport sector. A policy would, alongside creating guidelines to regulate the sector, create confidence and in the sector's potential among investors and producers.
- Technical, knowledge and infrastructural gaps must be addressed, such as building charging stations, technical maintenance training, and production. This would address potential labour, infrastructural and human capital shortages, help quicken the mode shift and help boost the confidence of Nigerians in adopting new transport technologies and modes. Although the ETP has laid emphasis on securing agreements with about five Original Equipment Manufacturers (OEMs) to begin the local manufacturing/assembly of key technologies to include electric vehicles, more support to domestic manufacturers need to be provided, including support for technical and skill development.

CONCLUSION

The ETP has rightfully acknowledged the role of the transport sector in Nigeria's energy transition and has factored in the Nigerian reality. However, a lot of work still needs to be done with regards to policy and sector investment. There is also a need to factor in hard-to-abate sectors in the long term, as they are the last mile sector that would close the gap and eventually achieve net zero carbon emissions in the transport sector.