

Techno-Commercial Analysis of Electric Vehicle – A Case Study on Tata Nexon EV

Abhishek Chavan

Student, Mechanical Department, Sanjay Ghodawat Institute, Kolhapur, Maharashtra, India

Abstract:- India today is one of the main ten automotive markets on the planet and given its enormous working class populace with purchasing potential and the consistent financial growth. Speeding up electric auto deals is relied upon to proceed. The primary viable electric vehicles were delivered during the 1880s. From 2008, a renaissance in electric vehicle manufacturing happened because of advances in batteries, and the craving to decrease ozone harming substance discharges and further develop metropolitan air quality. Electric vehicles are worked on battery and electric motor so in EVs no ignition gases are framed because of nonappearance of IC engine. EVs discharge no tail pipe poisons gases like CO₂, NO_x and furthermore they can possibly diminish ozone harming substance emanation just as less air contamination. EVs are viewed as a promising answer for future transportation. Surveying future interest for electric vehicles Indian multinational company - Tata motors, formerly Tata Engineering & Locomotive Company which is greatest auto assembling organization in India began creating new age of vehicles. Tata motors in December 2019 divulged their one of the predominant item Tata Nexon EV which is electric vehicle having 3 variations in 3 shades having extraordinary millage and execution contrast with the other vehicle in rivalry in reasonable value range.

Keywords:- Tata Motor, Electric Vehicle, Nexon EV.

I. INTRODUCTION

Tata Motors in the wake of presenting their state of the art EV innovation - Ziptron they dispatched India's Own battery electric vehicle (BEV). The Nexon EV is an optimistic SUV for individual vehicle purchasers searching for an exciting, associated drive insight with zero discharges. Controlled by the state of the art Ziptron innovation, this vehicle guarantees an effective high voltage framework, zippy execution, long-range, quick charging ability, expanded battery life and class driving security highlights.

Nexon EV is an elite, associated vehicle which is fit to address the yearnings of Indian clients and break all boundaries for EV appropriation. This improvement in EVs in India will check a significant achievement in India's vehicles electrification journey and creating supportable and mindful portability answers for India.

Accessible in three variations XZ+ LUX, XZ+ and XM, the Nexon EV will come in three invigorating shading alternatives which are - Teal Blue colour, Moonlit Silver and Glacier White. The vehicle will moreover accompany a guarantee of 8 years or 160000 km (whichever is prior) on battery and engine. The Nexon EV is evaluated from INR 15 to 17 Lakhs.



Figure 1: Front with sporty central grill

II. TECHNO-COMMERCIAL ANALYSIS

➤ Working of EV

At the point when you place vehicle in drive mode and push on the accelerator then, at that point - Controller directs electrical energy from batteries to the motor through the inverter. Inverter sends a specific measure of electrical energy to the motor as per profundity of pressing factor applied on accelerator. Emotor changes over current into mechanical energy. At the point when the brakes are squeezed or the vehicle is decelerating, the motor turns into an alternator and produces power, which is sent back to the battery.

➤ Configuration enlivened by India's safest vehicle – Nexon

The Nexon EV sports an intense and upbeat design that brings into play the impact design 2.0 language. The new plan is the solid and purposeful stance of the Nexon, bringing about a street presence that makes it stick out and separated. The thin, wide grille cum light element is highlighted by the Tata motors humanity line running from one light to another, adding a touch through its chrome treatment and more three-dimensional structure. Finishing the new plan of the front end is the guard with its energetic focal grille, point by point with the Tata motors signature Tri-Bolts.



Figure 2: Front with sporty central grill

Within, the Nexon EV cabin accompanies current plan, spacious interiors, and premium sound administration to convey an agreeable peaceful drive. The vehicle additionally accompanies a 7 inch Harman infotainment system offering first rate availability and unequalled acoustics. It additionally upholds Android Auto and Apple Carplay.



Figure 3: Interior of Tata Nexon EV

Nexon has 2 drive modes sport mode and drive mode. There are programmed gears and stuff switch having 4 modes neutral (N), park mode (P), drive mode (D) and reverse mode(R). Nexon EV is outfitted with an incredible and high efficiency 129 PS perpetual magnet AC motor controlled by a high capacity 30.2 kWh lithium-ion battery. The engine of Nexon generates 245 Nm of instant torque from a standstill. This assists Nexon EV with speeding up from 0 to 100 kmph in 9.9 seconds. The EV accompanies a best-in-industry dust and water verification battery pack which satisfies IP67 guidelines. This high-density battery pack is fluid cooled to dominate in Indian conditions. The battery pack is set under the vehicle body, giving the SUV a centre of gravity more much the same as that of a car or a hatchback, guaranteeing greatest security and fantastic unique execution on winding streets. Force goes ahead quickly and direct in drive mode which make it pleasurable to drive in city condition. In sport mode that think get intrigued on the grounds that there is 40% more useable torque. It uses savvy drive tech include

regenerative slowing down to charge the battery while drifting, Slope Climb and Plummet Help to make driving on inclines more advantageous with Creep highlight permits client to handle blocked city traffic without exhaustion.



Figure 4: Nexon EV engine & Ziptron technology

➤ About range and charging obstructions
 Nexon EV conveys uneasiness free long range of more than 300 kms on a solitary accuse of zero outflows. When connected to a Quick DC Charger, the Nexon EV charges 80% battery limit inside an hour. Likewise, the Nexon EV can be charged from any 15 amp plug point and it charges 10% to 90% in 8.5hr.

➤ Zconnect
 Nexon EV offers 35 mobile application based associated highlights, going from far off orders, vehicle following, driving conduct investigation, route and far off diagnostics. The ZConnect Application empowers proprietors to find the close by charging focuses, TML administration stations, set-up speed alarms, track vehicle location and a lot more highlights.



Figure 5: Zconnect app features

➤ India's Safest Car promise
 The Nexon EV holds every one of its learnings from the Nexon Global NCAP rating and accompanies class leading safety features. Demonstrating its unwavering quality, the

vehicle has been thoroughly tried across 1 million kms across the hardest territories in India, covering high elevations, unpaved streets, and steep inclinations and under outrageous climate conditions. Gives security highlight like Driver and Co-driver airbags, ABS with EBD and CSC, Driver safety belt, load limiters and crash-locking tongue, Kid - wellbeing back entryway locks, Follow-me-home headlamps, ISOFIX jetty focuses for youngster seat, Front mist lights, Back defogger, Camera based opposite park help with dynamic aide ways.



Figure 6: Safety features of Tata Nexon EV

➤ Analysis of Nexon EV

1. Technical specifications

No.	Category	Specifications
1.	Fuel type	Electric
2.	Max power	127bhp
3.	Max torque	245nm
4.	Seating capacity	5
5.	Transmission Type	automatic
6.	LI-ion battery capacity	30.2KWH
7.	Charging time	60min (0-80%)
8.	Motor power	130.7 bhp
9.	Motor type	3 phase permanent magnet
10.	Front suspension	Independent MacPherson strut with coil spring
11.	Rear suspension	Twist beam with dual path strut
12.	Steering gear type	Rack & Pinion
13.	Turning radius	5.1m
14.	Front brake type	Disc
15.	Rear brake type	Drum
16.	Length of car	3993mm
17.	Width of car	1811mm
18.	Height	1606mm
19.	Boot space	350liters
20.	Weight	1400kg

Table 1: Technical analysis of Tata Nexon

2. Commercial analysis

No	Category	Specifications
1.	Ex showroom price	Rs. 14.99lakh
2.	RTO Road tax + Other	Rs. 10650
3.	Insurance	Rs. 77425
4.	On road price in Pune	Rs. 15.87lakh
5.	Token amount	Rs. 21000
6.	Dealers	71 all over India
8.	Availability	3 variant & 3 colour
9.	Loan (By SBI)	Interest rate 7.50% p.a. Repayment period – min 3 year & max 8 years

Table 1: Commercial analysis of Nexon EV

III. RESULTS AND DISCUSSION

First In electric vehicle power source is from battery pack and an inverter changes over dc capacity to 3 stage ac this turns induction motor which turns drive wheel. The power and torque of EVs are handily controlled contrast with IC engine because of nonappearance of gear box unit. The next positive effect of the missing transmission and the general idea of the electric unit is its instant torque, offering greatest force from the steady position, while a combustion engine can just accomplish this at high velocity. The force conveyance is amazingly smooth and reachable at any snapshot of the drive, making it a security component if there

should arise an occurrence of conceivable quick reaction required in rush hour gridlock circumstances, like overtaking.

The clearest benefit of any electric vehicle over combustion engine vehicle is its zero tail pipe outflows, which is an irrefutable truth. Expanded utilization of electric vehicle would lessen the measure of exhaust cloud shaping poisons created by vehicles which runs on ordinary fuel.

Contrast with diesel vehicle EV require less support on the grounds that there are just around 20 moving parts in electric motor contrast and almost 2000 in IC Engine so will require lot less maintenance additionally you will not require a check-up or oil change like IC Engine.

1. Comparison between Nexon EV & Nexon diesel of same feature

Points	Nexon EV EZ Plus	Nexon XZA plus
On road price	Rs. 15.87 lakh	Rs. 15.36 lakh
Fuel type	Electric	Diesel
Max power	127bhp	108.5bhp
Vehicle stability control system	Yes	No
Leather seats	Yes	No
Emission	ZEV	BS VI
Max torque	245nm	260nm
No. of airbags	2	2
Available colours	3	6
Charge per km	Comparatively more	Comparatively less

Table 3: Comparison Nexon EV vs. Nexon diesel

2. Comparison of Nexon EV with competitors-

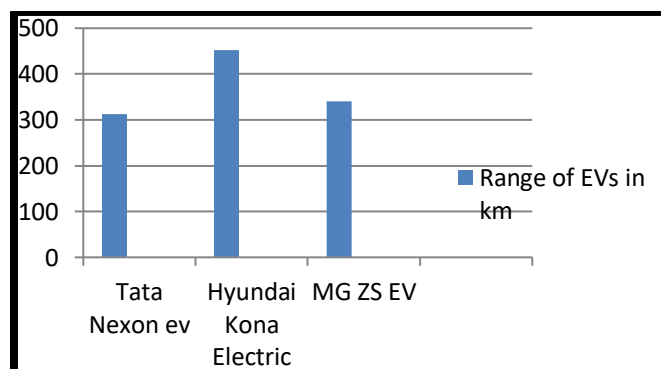


Figure 7: Comparison of range of EVs

3. Technical comparison of EVs

Vehicle	Battery kWh	Range km	Charging (AC) time hr.	Torque Nm	Power Nm	0-100 kmph time sec
Tata Nexon EV	30.2	312	8	245	127	9.9
Hyundai Kona electric	39.2	452	6	395	134	9.7
MG ZS EV	44.5	340	8	353	141	8.5

Table 4: Technical comparison of EVs

The table given underneath demonstrates why Tata Nexon is best among other contender electric vehicles in India.

Vehicles	Range in km/Lakh	Battery capacity in kWh/Lakh
Tata Nexon EV	22.3	2.16
Hyundai Kona electric	19.06	1.87
MG ZS EV	16.28	1.87

Table 5: Range & Battery capacity per lakh

IV. CONCLUSION

The consequences of this study unmistakably show that, significance of the any electric vehicle over IC engine vehicle is its zero tail pipe outflows, which is an undeniable truth. Expanded utilization of electric vehicle would lessen the measure of exhaust cloud framing poisons created by vehicles which runs on traditional fuel. Electric vehicles are better for climate as well as extraordinary vehicles to possess and to smooth, quiet just as speedy speeding up drive. Subsequently, electric vehicles are viewed as a promising answer for future transportation. Indian multinational company– Tata motor which is greatest automobile manufacturing company in India introduced their one of the Best and predominant item Tata Nexon EV is best electric vehicle among other contender electric vehicles in India. By comparing with the traditional fuel vehicles of same class the performance of the Nexon EV is satisfactory and comparing with one of the top other electric vehicles accessible in Indian market Nexon, the performance EV with its expense and its advance feature makes Nexon EV great. By considering it's similarly with less value Tata gave much preferable facilities in the vehicle over the other electric vehicles in market. At last I can infer that the Tata Nexon EV offers you the incentive for cash.

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