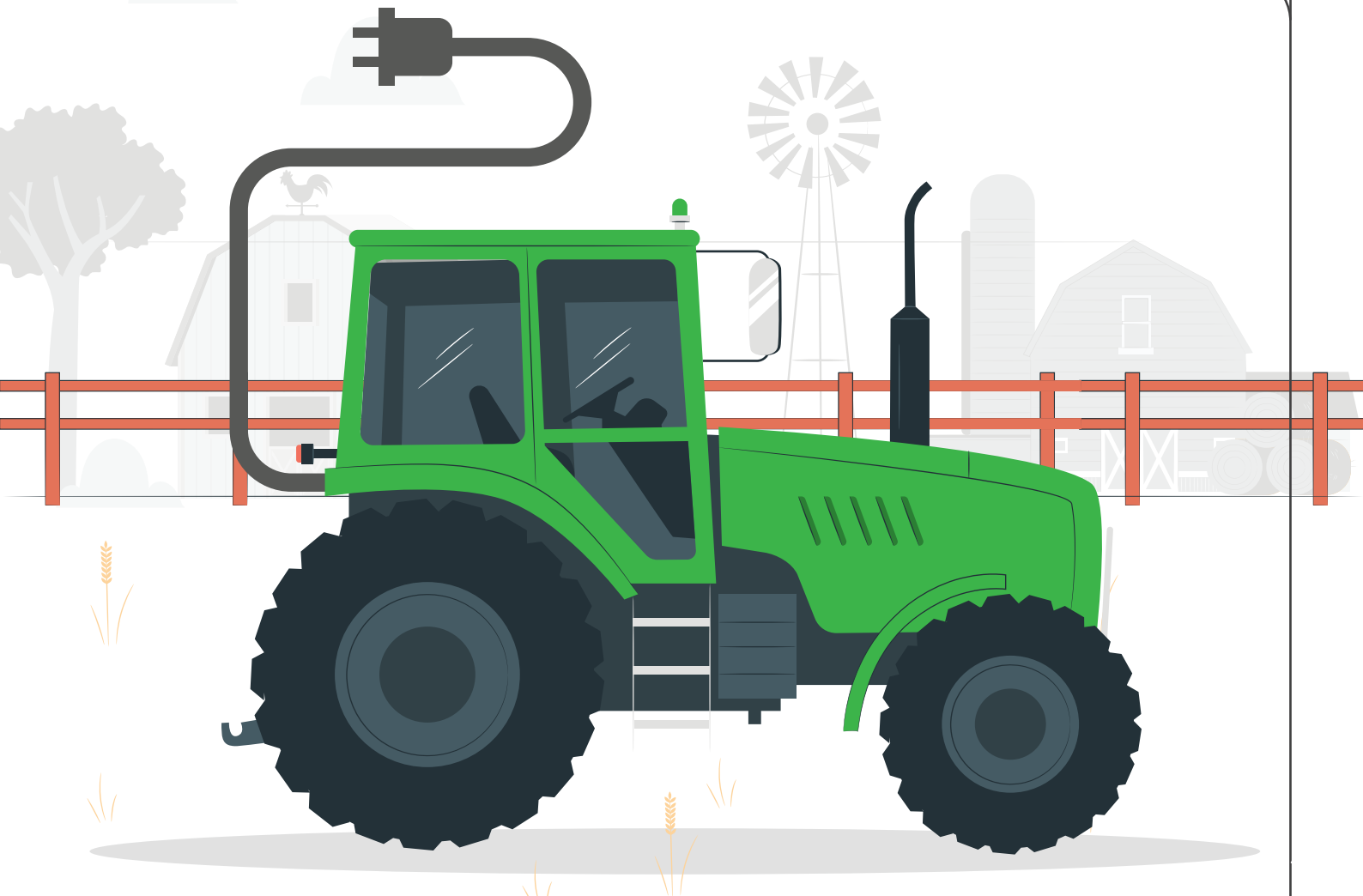
JMK Research & Analytics

AUG 2024

Electric Tractors in India:

A CONCEPT OR A REALITY?



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Based on our in-depth sector experience, strong industry network in the Indian sustainability market, we provide key insights and detailed industry information that helps our clients develop successful business models and market strategies.

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INTRODUCTION

India has been a prominent producer of diesel tractors, which account for about 7.4% of the country's annual fuel consumption.[1] These tractors are primarily used in agriculture, a sector where their usage is steadily increasing. As a result, the greenhouse gas emissions from these tractors are also on the rise. India contributes approximately 7.3% to global emissions, with transportation and agriculture accounting for 8.36% and 14% of that, respectively.[2] This emphasizes the urgent need for India to transition towards the electrification of tractors and adopt advanced agricultural technologies to reduce these emissions. Shifting from conventional internal combustion engine vehicles to advanced electric tractors would significantly decrease India's global greenhouse gas emissions.

The concept of electric tractors is still in its early stages in India. Despite the country's significant progress in electrifying other categories, such as electric two-wheelers (E2Ws) and electric three-wheelers (E3Ws), electric tractors (E-Tractors) remain primarily nascent. However, as the nation continues to embrace and advance in electrification, there is potential for the electric tractor market to develop in the near future.

INDIAN TRACTOR MARKET

Diesel Tractor Market

India is predominantly driven by diesel tractors, with over 8.81 lakh units registered, accounting for 3.57% of the total vehicle population in the country for FY2024. The country's export footprint is significant, with 10.33% of the total manufactured tractors being exported to international markets.[3] These significant number solidifies India's position as the world's largest manufacturer and exporter of tractors.

From FY2016 to FY2024, the diesel tractor market has grown at a compound annual growth rate (CAGR) of 8.29%, indicating a significant opportunity in this segment. In terms of player wise share, the top five players dominate this market with approximately 85% share in FY2024.

[1] ICCT - **INCENTIVES FOR ELECTRIFYING AGRICULTURAL TRACTORS IN INDIA,** October 2022

[2] EDGAR- **GHG emissions of all world countries,** 2023 report

[3] Tractor and Mechanization Association - **Monthly Reports CY2023-CY2024**

Figure 1: Diesel tractor units registered FY2016-FY2025 (YTD Jun-24)

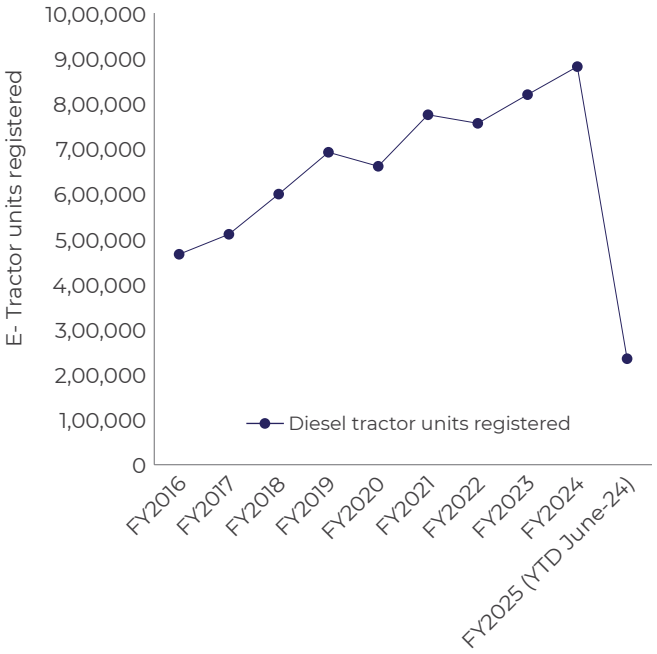
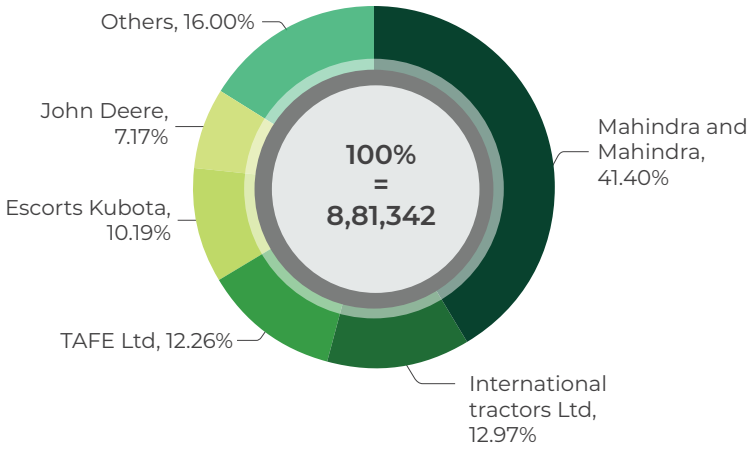


Figure 2: Key diesel tractors players in FY2024



Source: Vahan Dashboard, JMK Research

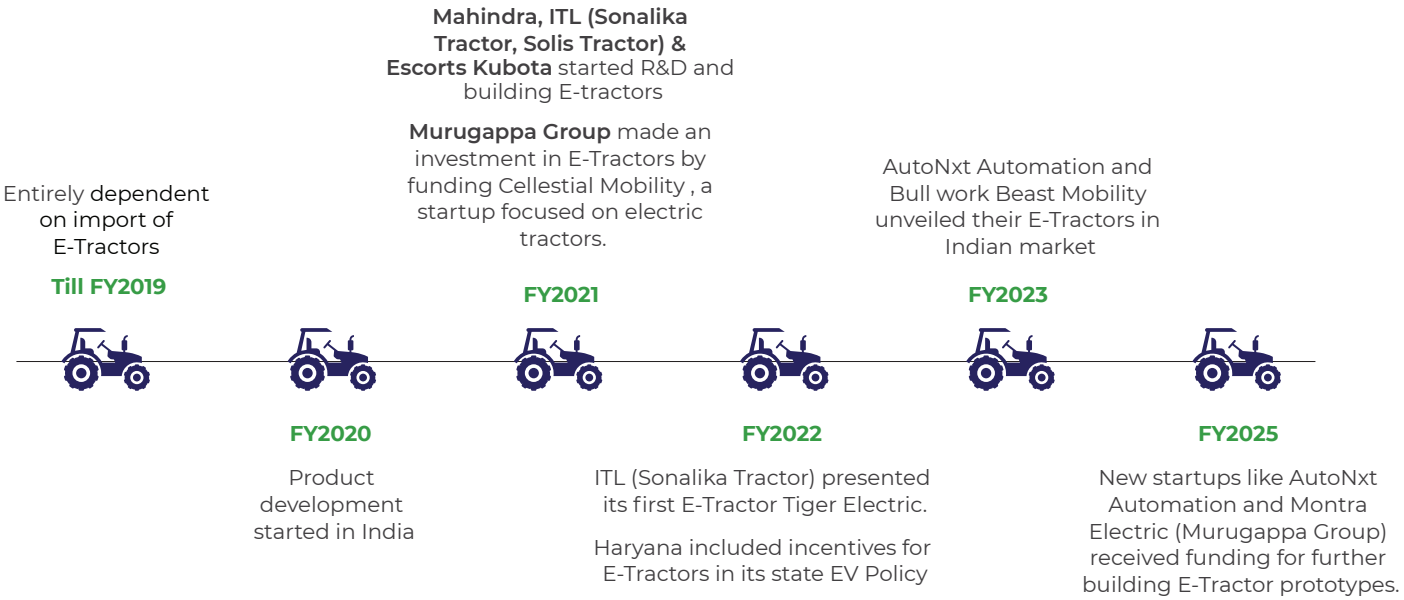
Most of these diesel tractors are manufactured within India, demonstrating the country's strong domestic production capabilities. This extensive local manufacturing not only meets the high demand within the country but also positions India as a key player in the global tractor industry.

However, the substantial growth of the diesel tractor market is overshadowed by the increasing emissions from these tractors, emphasizing the urgent need for electrification in the sector.

ELECTRIC TRACTOR MARKET

Currently, there are only a few electric tractors in use in India. The development and introduction of electric tractors in India have followed an interesting trajectory. Up until FY2019, India had only a limited number of electric tractors, all of which were imported models from other countries. However, this began to change in FY2020 when domestic product development for electric tractors started.

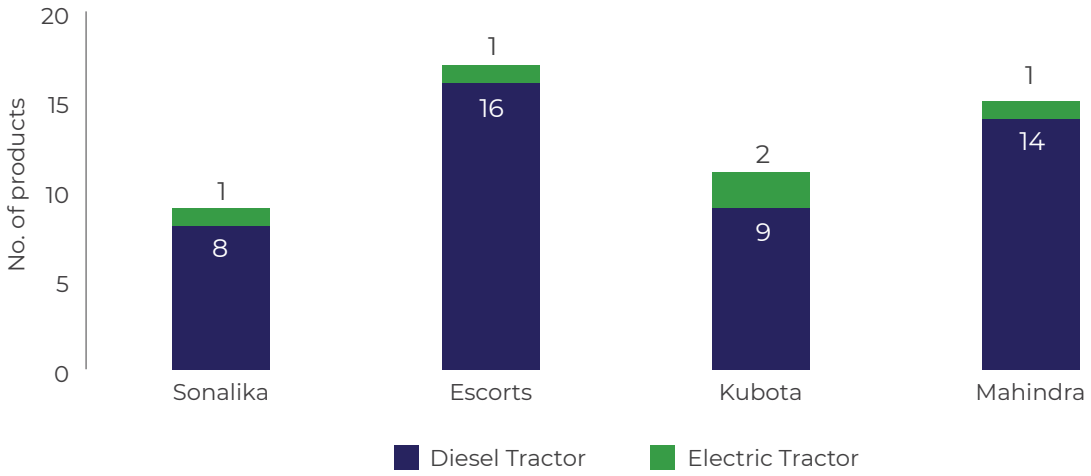
Figure 3: Timeline of the E-Tractors Market in India



Traditional diesel tractor manufacturers, such as Mahindra, Escorts Kubota, and International Tractor Limited (Sonalika Tractors), have conducted R&D and built first few prototype e-tractor models in India.

While other companies like AutoNxt Automation, Bull Work Mobility, and Powerland Agro were exclusively developing electric variants only.

Figure 5: No. of Diesel and E-Tractors models built by various OEMs



Source: Industry interviews, Company Website, JMK Research

So far, 127 e-tractor units have been registered cumulatively in India. This includes imported E-tractor vehicles from other countries as well as sales of prototype E-tractor vehicles built in India.

In terms of state- wise deployment, the highest number of electric tractors has been registered in key agricultural states such as Haryana and Punjab. Companies are targeting specific customers within these states to evaluate the performance of their prototypes and refine their designs. This approach aims to gather valuable insights and prepare the tractors for broader commercial availability in the near future.

Haryana and Punjab have significant potential for expanding the electric tractor market. Utilizing strategic targeting methods, such as application-specific pilot programs and increased farmer awareness, will be crucial to harness this potential.

Figure 6: Electric Tractor Registrations in India

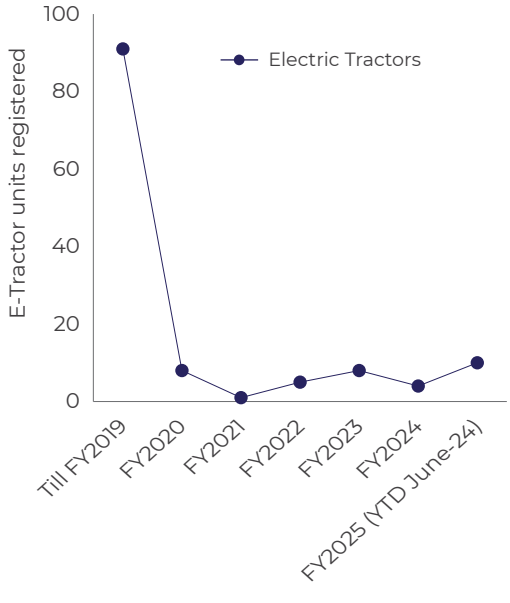
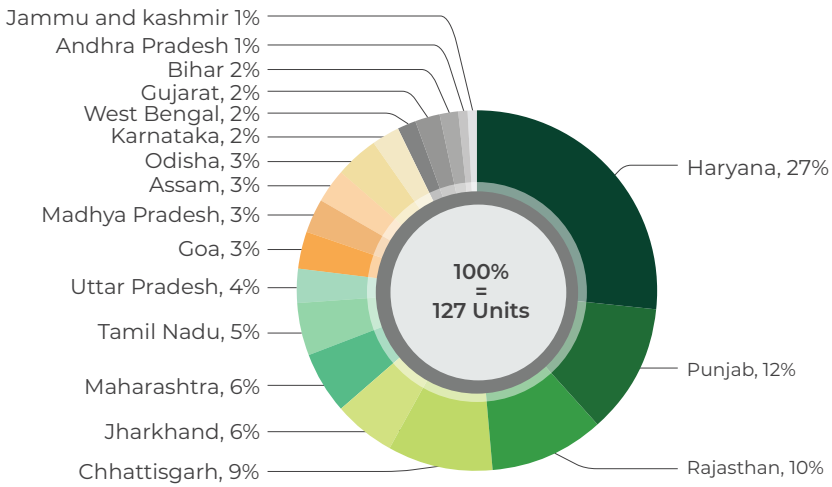


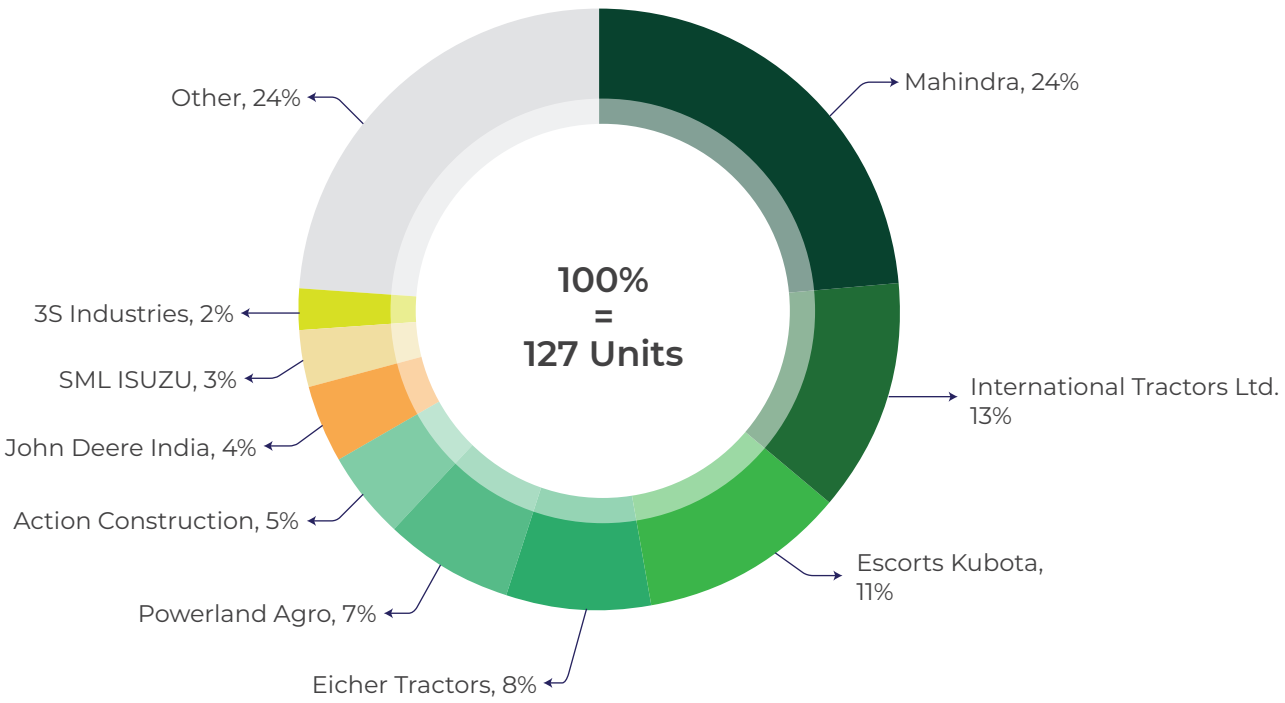
Figure 7: State wise Sales
(Cummulative As on YTD Jun-24)



Source: Vahan Dashboard, JMK Research

As per the industry interviews, having completed the prototyping phase, these electric tractor models were mainly distributed to select target customers for pilot testing to assess their practical viability in real-world conditions.

Figure 8: Player wise market share (Cummulative As on YTD Jun-24)



Analysis from industry interviews regarding the cumulative registration of 127 units reveals the following:

- Even though the chart shows that Mahindra contributed 24% to the sales of 127 units, it's important to note that Mahindra's E-tractor model is still in the R&D stage and not yet available for commercial sale. Most of these registered units are being used internally or within Mahindra's subsidiary companies.
- Brands like John Deere, SML ISUZU, and Eicher Tractors have developed prototype E-tractors outside India. The registrations for these companies in the graph represent imported E-tractors.
- Powerland Agro, contributing 9% to the sales, has its ATV Xplore & Tachyon available for commercial sale. Similarly, International Tractor Limited (Sonalika Tractors and Solis) has its Sonalika Tiger Electric model available for sale in the Indian market, but in limited quantities.
- Escorts Kubota's Farmtrac, although built and manufactured in India, is currently being exported to the USA and Europe due to the stringent Stage 5 emissions norms in these regions, which have made the switch to electric tractors necessary.

E-Tractor Models in India

The following section provides a comprehensive overview of the specifications of electric tractor models by key players that have completed the prototyping phase and are available for commercial sale. However production is not yet started for most of these at a commercial scale because of lack of demand.

Table 1: Existing E-Tractor Models Successfully Completing Prototyping Phase

	Sonalika Tiger Electric (International Tractor Limited)	AutoNxt Automation X45H2	Powerland Agro ATV (XPLORE & TACHYON)	Escorts Kubota Farmtrac FT25 G	Bull Work Mobility Beast
Application	Agricultural tractor	Agriculture and Haulage	-	Agriculture tractor	Farming, ware-housing and construction
Battery Capacity	250 -350 A	35 kWh	11 kWh	300 AH	28 kWh/ 60 kWh optional
Motor Power	11 kW	32 kW	-	18 kW	30 kW
Charging time	10 hours (Slow)/ 4 hours (Fast)	8 hrs (Slow Charger) / 2 hrs (Slow Charger)	6 hrs (Fast Charger)	8 hrs	5-7 hours
Run Hours per Charge	-	4-8 hours depending on application	Up to 110 km in Eco Mode depending on application	-	-
HP	-	45 HP	50 HP	-	35-55 HP
Other	Lifting capacity – 500 kg	-	Torque - 210 Nm Lifting capacity – 500 kg	-	Lifting capacity- 1100 kg

Source: JMK Research, Company Interviews, Company Websites

Companies like AutoNxt, Murugappa and International Tractor Limited are other companies whose e-tractor models are still in the prototyping phase. International Tractor Limited (Solis Tractors) has already launched the Solis SV 26 in international markets, including Europe, the USA, Africa, and South America. The company is now preparing to introduce this model in India, where production for the export market is already underway at their manufacturing facility in Punjab.

Table 2: Upcoming E-Tractors Models in India

	AutoNxt Automation X45H4	AutoNxt Automation X60H2	AutoNxt Automation X60H4	AutoNxt Automation X25H4	Murugappa Group Cellestial HP 55/35/25	Solis SV 26 (International Tractor Ltd)
Application	Agriculture	Agriculture	Agriculture	Small Haulage Activities	Agriculture	Agriculture
Battery Capacity	35 kWh	35 kWh	35 kWh	15 kWh	Li-ion	326 Ah (Additional 20 Ah tractor)
Max. Power	32 kW	32 kW	32 kW	15 kW		17 kW
Charging Time	8 hrs (Slow) / 2 hrs (Fast)	8 hrs (Slow) / 2 hrs (Fast)	8 hrs (Slow) / 2 hrs (Fast)	8 hrs (Slow) / 2 hrs (Fast)	6 hrs	3-3.5 hrs (Fast)
Run Hours per Charge	Run time - 8 hours ~ 8 acres	Run time - 8 hours ~ 8 acres	Run time - 8 hours ~ 8 acres	Run time - 5 hours ~ 5 acres	Range – 75 km	Run time ~ 6 hours
Other	Lifting capacity – 500 kg	-	Torque - 210 Nm Lifting capacity – 500 kg	-	Lifting capacity- 1100 kg	

Source: JMK Research, Company Interviews, Company Websites

In addition, companies such as Cellestial E-Mobility, supported by the Murugappa Group, and AutoNxt Automation have secured substantial investments in recent years. These firms are expected to introduce their electric tractor models to the Indian market soon.

KEY CHALLENGES

Despite the numerous advantages of electric tractors over traditional ICE tractors, the electric tractor sector faces several challenges to be viable in Indian market. These challenges include:

High upfront cost of E-Tractors:

The adoption of electric tractors in the Indian market can face significant challenges due to the cost disparity compared to traditional diesel tractors. While diesel tractors typically range from INR 4 lakh to INR 10 lakh, electric tractors are expected to be priced between INR 7 lakh and INR 14 lakh. This higher price point may deter farmers and businesses who find it challenging to justify the upfront investment despite potential long-term savings.

Lack of Government Support:

There is no inclusion of E-Tractors in the national EV Policy (FAME II) or in state- specific EV policies with the exception to Haryana. Currently, Haryana is the only state offering purchase incentives for E-Tractors in India, which is 50% of ex- showroom price of the vehicle up to INR 5.00 Lakh for the first 1000 units of electric tractors purchased and registered in the state as mentioned in Haryana Electric Vehicle Policy 2022. This lack of government support on the manufacturing front hinders OEMs from entering the space, as there is less confidence in the new technology. Additionally, the absence of consumer purchase incentives is not driving the demand for E-Tractors in the market.

Limited Consumer Awareness:

Farmers lack awareness of the benefits of electric tractors, especially in terms of total cost of ownership over an extended duration. They also suffer from technological illiteracy, as they are not familiar with the operation and functioning of electric tractors.

Absence of Charging Infrastructure:

The lack of charging stations in agricultural regions limits the convenience and feasibility of using E-tractors for daily farming activities. Moreover, frequent power cuts in rural parts further exacerbate this issue, as the availability of consistent and reliable electricity is crucial for charging E-tractors. These infrastructural gaps not only hinder the efficiency and productivity of farming operations but also deter potential buyers from investing in E-tractors, thereby slowing down the transition to sustainable agricultural practices.

RECOMMENDATIONS AND WAY FORWARD

Certain areas could be worked upon to accelerate the adoption of E-Tractors in the Indian market:

1. Supporting Policies and Schemes

Support from the Government of India could significantly accelerate the growth of the electric tractor market. Including electric tractors in the new FAME-III Policy would provide a significant boost, introducing consistent incentives for purchase and manufacturing that would facilitate widespread adoption. By offering incentives and subsidies, the high initial investment cost of electric tractors could be alleviated, effectively narrowing the cost gap between electric and diesel tractors, leading to a substantial increase in sales. Additionally, states should offer specific financial incentives for electric tractors and include them in their State EV Policies. Providing manufacturing incentives to OEMs is also crucial, as it would encourage investment in production capabilities and the development of new models.

2. Stringent emission norms

The government can implement strict emissions standards for agricultural machinery, drawing inspiration from the Stage 5 emissions standards set by European countries. This would encourage farmers to transition from diesel to electric tractors, thereby boosting market demand. On the OEM front, the government could mandate that manufacturers introduce a specific number of EV models each year alongside their ICE products.

3. Reduction in the Taxes

The current tax rate for an electric tractor is the same as that of a diesel tractor, which is 12%. Slight relief in the tax could lead to a significant increase in sales growth as it could cut the cost competitiveness between diesel and electric tractors.

4. Reduce Interest rates of Loans on E-tractors

Financial incentives like reducing the interest on agricultural loans could help farmers procure E-Tractors as the initial cost associated with it is higher than diesel tractors. Electricity is one of the major components to operate E-Tractors. Offering subsidies on electricity can reduce the cost gap between the operational cost of a diesel tractor and an electric tractor.

5. Pilot Programs

Organizing case-wise pilot programs in different states to study the potential of electric tractor market growth would help manufacturers understand the performance of tractors in different areas and terrains. The data collected from these pilot projects could be used to develop policies and refine existing technologies to target a wider range of farmers. Additionally, successful pilot projects should be used to raise awareness about E-Tractors among farmers.

CONCLUSION

India is an agricultural nation that heavily relies on diesel-driven tractors. Reducing emissions from this segment is crucial to achieving the country's goal of achieving net zero emissions by 2070.

The large diesel tractor market in India presents a significant opportunity for electrification. Developing E-Tractor models that can compete with their ICE counterparts holds great potential for market growth. Although there are handful of commercially available E-Tractor models in India whole production is also not yet started because of lack of demand. Some ICE tractor OEMs are slowly entering the E-Tractor segment, with a few products having passed the prototyping phase.

The E-Tractor market in India remains nascent due to insufficient policy support, demand, and infrastructure. To boost demand, the government must provide suitable purchase incentives to consumers, encouraging OEMs to accelerate product development and introduce new models. Additionally, manufacturers should receive incentives to alleviate financial concerns for startups exploring this new technology.

OEMs like Sonalika can start production at scale for market-ready products, such as the Sonalika Tiger Electric, even in a market with lower demand. The government can play a pivotal role by implementing measures to stimulate demand, including offering incentives, subsidies, and tax benefits, and investing in infrastructure to support the adoption of electric tractors.

Furthermore, the government can initiate pilot projects to assess the viability of E-Tractor models developed by OEMs. These pilot projects would provide valuable real-world data on performance, reliability, and user acceptance, helping to refine and improve the technology. By collaborating with OEMs and farmers, the government can ensure that these pilot/ demonstration projects address the practical challenges faced in agricultural operations. Successful pilot projects would not only demonstrate the feasibility of E-Tractors but also build confidence among stakeholders, paving the way for wider adoption and encouraging further investments in this emerging sector.

Transitioning from diesel to electric tractors presents a significant opportunity for India to reduce emissions and enhance sustainability in the agricultural sector. Given the country's large and growing population, the demand for agricultural machinery is set to rise, offering a substantial market for electric tractors. By leveraging favourable economics, falling battery prices, strategic pilot projects, and a coordinated effort across stakeholders, India can effectively develop a robust market for electric tractors in near future.

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EV ONLINE DASHBOARD

Registrations 01
Overall EV count registered and bifurcation as well as further analysis of different types of EVs - E2W, E3W, E-Car, E-Buses. Yearly as well as monthly capture available

Models 02
Existing and recently introduced models of all vehicle types with information on range, charging time, ex-showroom prices, top speed, battery type etc.

E2W Player Profiles 03
Company description, month-wise registrations, models, dealership network, investments/JVs/partnerships

Investments & JVs/Partnerships 04
Related information captured basis vehicle type, deal type, and company type

Tenders 05
~50 tenders with status of all announced (2019 onwards) and awarded tenders and Expression of Interest

Policies 06
All State-announced/notified/drafted EV policies in consolidated form as well as for different vehicle segments, charging infrastructure, and manufacturing. This includes targets to be achieved and incentives offered as part of state policies and FAME-I, FAME-II

Value-chain 07
Batteries' and charging infrastructure-related all relevant information captured here

Market Share/ Projections 08
Market share data available for Segments/OEMs/Li-Ion Batteries (LIB)/Charge Point Operators (CPOs). Likewise, projections available and continuously updated for segment-wise market shares and LIB/LIB end-use shares.

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	Monthly Excel Tracker	✓	✓	✓	✓	Every month 3 Excel Trackers will be shared 1. Sales (OEM wise, State wise, city wise) 2. Product Models launched 3. Investments & Deals tracker
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