



AUTOMOTIVE

# The Indian Automotive Industry

## Evolving Dynamics

KPMG IN INDIA

# Foreword

The automotive industry is one of the focus industries for KPMG globally, given its importance both in the mature economies of countries such as the US and Germany, and in the emerging economies of China and India.

The Indian automobile industry has emerged stronger from the recent global downturn, and sales across all segments have seen record breaking numbers in the recent past.

While the Indian industry has much to look forward to, by way of steady growth in both domestic and export markets, there are some clear challenges accompanying the opportunities in greener vehicles and alternative mobility.

In order to capitalize on these opportunities, the industry needs to develop or acquire technologies and capabilities to produce vehicles that meet future market needs.

The government for its part has much to do to ensure the growth trends are maintained, and encourage the development of greener vehicles, while also improving compliance to even existing environmental standards.

This report attempts to capture how the Indian automobile industry is expected to develop in the longer term, and what role each stakeholder needs to fulfill in order to be geared up for evolving requirements.

We have been aided in our study by several senior executives from India's automotive sector and we would like to express our gratitude to each of them.

It has been an exciting exercise for us to compile this report through discussions with various industry personnel and by examining similar trends developing in other markets. We hope that you find it interesting and insightful too.



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# 1

## Executive Summary

**Introduction:** Demographically and economically, India's automotive industry is well-positioned for growth, servicing both domestic demand and, increasingly, export opportunities. A predicted increase in India's working-age population is likely to help stimulate the burgeoning market for private vehicles. Rising prosperity, easier access to finance and increasing affordability is expected to see four-wheelers gaining volumes, although two wheelers will remain the primary choice for the majority of purchasers, buoyed by greater appetite from rural areas, the youth market and women.

Domestically, some consolidation or alliances might be expected, driven by the need for access to better technology, manufacturing facilities, service and distribution networks. The components sector is in a strong position to cash-in on India's cost-effectiveness, profitability and globally-recognized engineering capabilities. As the benefits of collaborations become more apparent, super-specialists may emerge in which the automobile is treated as a system, with each specialist focusing on a sub-system, akin to the IT industry. Though this approach is radical, it could prove an important step in reducing complexity and investment requirements, while promoting standardization and meeting customer demands.

Manufacturers are already planning for the future: early advocates of technological and distribution alliances have yielded generally positive results, enabling domestic OEMs to access global technology and experience, and permitting them to grow their ranges with fewer financial risks.

This exciting outlook for the industry is set against a backdrop of two potentially game-changing transportation trends – the gradual legislative move towards greener, gas-based public transport vehicles, and a greater requirement for urban mass mobility schemes to service rapidly-expanding cities.

- **Green Revolution:** In a price-conscious economy such as India's, the shift towards green vehicles will be slow unless spurred by government mandates. Although the major players are already equipped with the necessary capabilities to develop cleaner vehicles, they do not see much merit in commercializing these technologies until the green revolution gains momentum – most likely through changes in political legislation – and it achieves the market scale required for commercial viability.

Manufacturers are placing greater faith in dual-fuel technologies than in battery-powered alternatives because the necessary support infrastructure, such as recharge stations, is not yet in place for the widespread adoption of the latter. The launch of electric motorcycles could have a significant impact on the market, given that motorcycles account for the majority of two-wheeler sales in India.

Manufacturers of four-wheelers and commercial vehicles in particular stress the importance of optimizing conventional combustion engines before experimenting too radically with costly new technologies.

- **Mobility Revolution:** Use of public transport in India has waned as private vehicle ownership has boomed, but increasing strain on the road infrastructure in major cities means public investment is likely in Urban Mass Mobility Schemes such as metro systems and buses. The automotive industry is unlikely to lose much of its customer base in the near-term, even as these schemes become more prevalent, because the socio-economic statement of car ownership will continue to make private vehicles desirable.

At present there is a lack of clarity in the automotive industry over the role it will play in any mobility revolution. Although some industry experts believe the impact of the mobility revolution will be minimal in the short-term, there may be opportunities for manufacturers to become involved with the public sector in areas such as improving links between different modes of transport.

**Conclusion:** Current low car penetration, rising prosperity and the increasing affordability of private vehicles offer a healthy prognosis for the Indian automotive industry. The companies benefiting most from this evolving landscape will be those who forge judicious alliances and resource-sharing agreements, who prepare for the growing importance of green technologies, and who remain flexible enough to respond to the twin needs of private light transport and mass transport schemes.

# 2

## Introduction



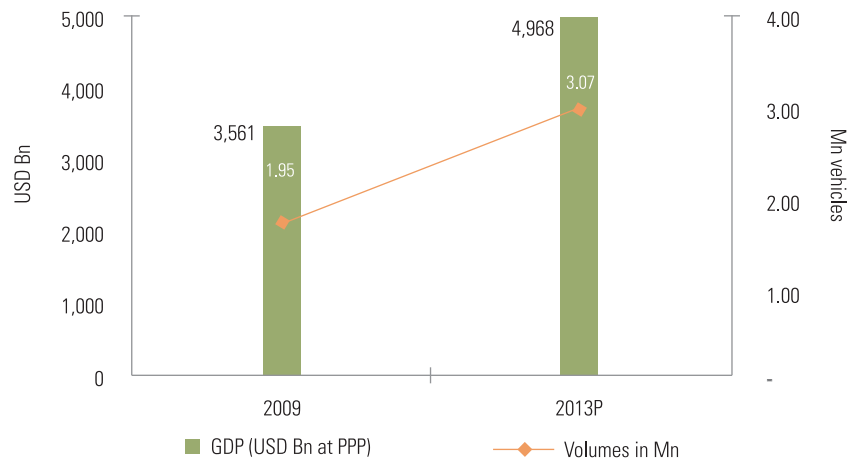


India is home to a vibrant automobile of more than 40 million vehicles. It has been one of the few worldwide which saw growing passenger car sales during the recession of the past two years. In fact, in 2009-10 it has recorded its highest volumes ever. It is believed this upward trend will be sustained in the foreseeable future due to a strong domestic market and increased thrust on exports.

The Indian economy has grown at an average rate of around 9 percent over the past five years and is expected to continue this growth in the medium term. This is predicted to drive an increase in the percentage of the Indian population able to afford vehicles. India's car per capita ratio (expressed in cars per 1,000 population) is currently among the lowest in the world's top 10 auto markets.

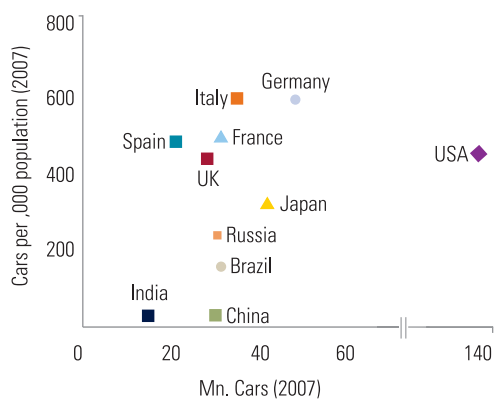
The twin phenomena of low car penetration and rising incomes, when combined with increasing affordability of cars, are expected to contribute to an increase in India's automobile demand.

Figure 1: Indian GDP growth vs. Annual passenger vehicle volumes



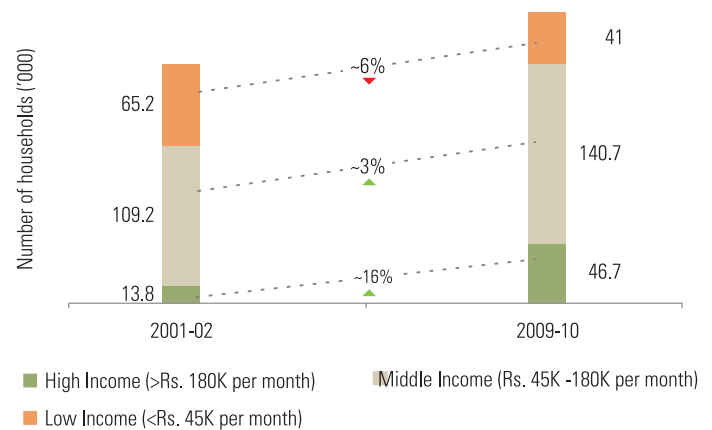
Source: EIU, KPMG Research

Figure 2: Car population vs. Cars per 1000 population



Source: World Bank, KPMG Research

Figure 3: Growth in Population Categories with higher incomes



Source: NCAER Estimates

The automotive industry is one of the key drivers of India's economy, accounting for around 4 percent of India's GDP<sup>1</sup> and over 200,000 jobs. It is also a focus area for KPMG globally. KPMG regularly publishes reports on client industries including the automotive sector. This study which is focused on the Indian market contains insights from two such global reports, the KPMG Global Auto Executive Survey 2010 and Brand & Ownership Concentration in the European Automotive Industry. It analyzes data and examines three emerging themes within the Indian context:

- Growth and consolidation
- Green revolution
- Mobility revolution

For this study, KPMG conducted interviews with senior executives from Indian and global automotive companies to gain their views on the above themes.

## Key themes explored in our study

In this study, KPMG has explored the key themes of growth and consolidation in the automobile industry as well as examined the impact of greener automobiles and the need for alternative mobility options on the automobile industry. We believe that these themes will have a significant role to play in determining the shape and structure of the India automotive industry of the future. Towards this, KPMG has asked the following questions:

### Theme 1: Consolidation and changing business models in the context of growth in the Indian market

- What are the key growth drivers for the Indian automobile industry?
- What are the likely challenges in the context of consolidation – both globally and in India?
- Are contract manufacturing/alliances for manufacturing or distribution becoming the choice for capacity enhancements?

### Theme 2: Green revolution

- Are customer preferences shifting to alternative fuel based cars?
- Is consumer activism expected to drive demand for greener vehicles in the near future (5-10 years)?
- What are the various initiatives taken by Indian companies in the areas of greener automobiles?

- What is the potential for the Indian automotive industry to emerge as a significant part of the green revolution?

### Theme 3: Mobility revolution

- Are planned investments in Urban Mass Mobility Solutions in major cities across India expected to affect the growth of the automobile market?
- What role should be played by the automotive industry in providing transportation solutions?
- What are the investment plans of companies (if any) in alternative mobility solutions?

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<sup>1</sup> Business Monitor International







# 3

## Indian Auto Sector – Medium term



The Indian automobile industry has seen interesting dynamics in recent times with the effect of the global downturn, followed by recovery in domestic demand. The future of the industry in the medium term based on current trends, is analyzed here along two broad themes in the global automobile industry:

- Growth
- Consolidation

As discussed below, the nature of demand in the Indian automotive industry and the associated drivers are likely to take it along a path, which is different from the evolving global automotive landscape.

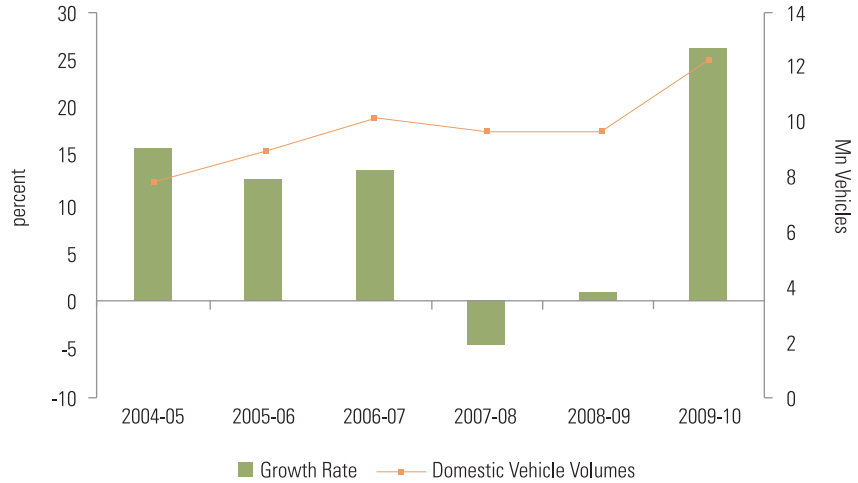
## Growth

India's automobile market has grown steadily over the last seven to eight years, with the exception of the previous two years where the effects of the global downturn were felt, primarily in sales of commercial vehicles. However, even during the downturn, the two-wheeler and three-wheeler segments, which were until then experiencing low growth or losing volumes, bucked the trend.

As Figure 5 shows, India's vehicle demand is quite different from other top automobile markets – with the exception of China – in that two-wheelers constitute a significant portion of vehicle demand (more than 3/4<sup>th</sup> of the Indian market is in two-wheelers).

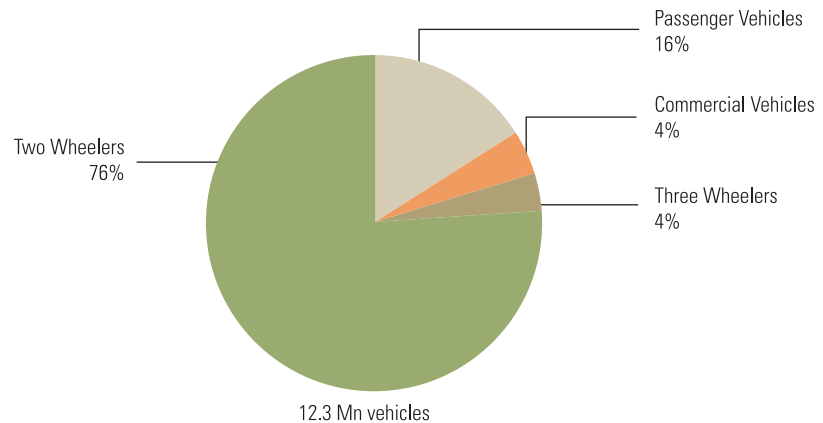
In the context of the unique characteristics of the Indian automobile market, growth is expected to be driven by the following:

Figure 4: Domestic vehicle volumes (annual) vs. Year-on-year growth rates



Source: SIAM

Figure 5: Indian Automobile Market 2009-10 Domestic Sales Volumes



Source: SIAM

## Affordability

While quite a few new vehicles launched in the Indian market have been developed locally, vehicle affordability remains a significant concern as seen in Figure 6. Although the price of an average motorcycle in India (about USD 900) is comparable to the average per capita income, the prices of passenger cars have a long way to go. Although the entry level car (Nano) is priced at around USD 2,500, the passenger car market could grow multi-fold if there is a break-through of another price level in the years to come.

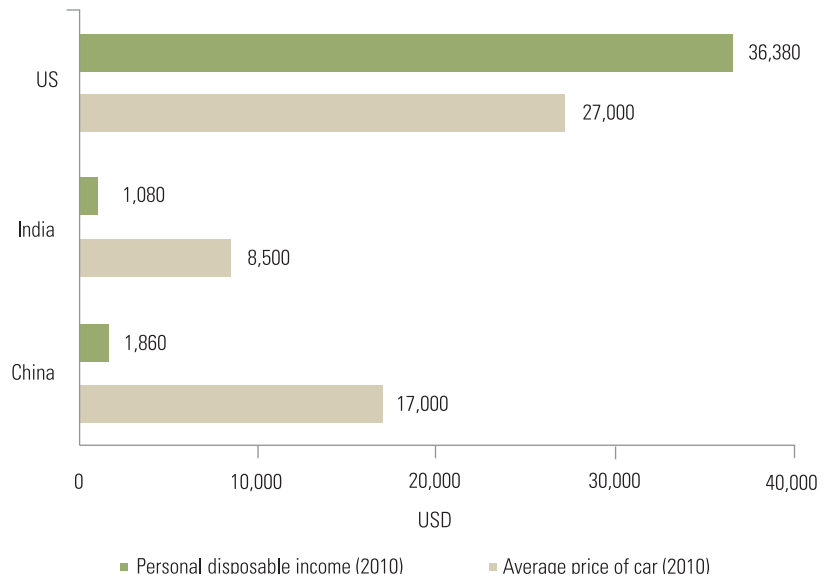
John Flintham, global CEO of Amtek Auto, believes four-wheelers are particularly well-placed to take advantage of these changing trends. "If you look at the Tata Nano, people buying two-wheeler bikes who have a bit more disposable income and can now afford to buy a car instead. I think you're going to see a doubling of sales over the next three to four years and I think that's going to be driven by both domestic demand and by India becoming a small car export hub."

Ford India Managing Director, Michael Boneham, believes changing demographics in India will see auto sales scale new heights. He argues that the increasing number of educated people entering the working age bracket will provide a fertile environment for a buoyant economy and healthy demand for private light transport. "The Indian auto industry should have double digit growth levels for the next five years and beyond, depending on taxation, legislation, infrastructure and global conditions," he says.

## Fuel Economy

The volume leaders across two-wheelers and four-wheelers in India are companies which have been able to offer products with

Figure 6: Vehicle affordability



Source: KPMG Research, EIU

the globally acknowledged best-in-class fuel economy rates, as well as affordable total cost of ownership. For example, while the US is setting norms for cars to achieve 35 mpg<sup>1</sup> on petrol<sup>2</sup>, a majority of Indian cars already offer that much<sup>3</sup>, while the leading-class bikes offer up to 200 mpg<sup>3</sup> and more in some cases. This performance expectation will only increase in the future. Fuel economy will also be an important factor in the truck sector, with Marc Llistosella, CEO and Managing Director of Daimler India Commercial Vehicles, noting that a vehicle's mpg rating will become an increasingly important purchasing factor. "No one buys a truck for leisure," he says, "greater efficiency means better fuel consumption and this is in our interest. Some 65 percent of the total cost of ownership of a truck is fuel consumption. This goes directly to the profit and loss of the customer"

## Alternative Fuels

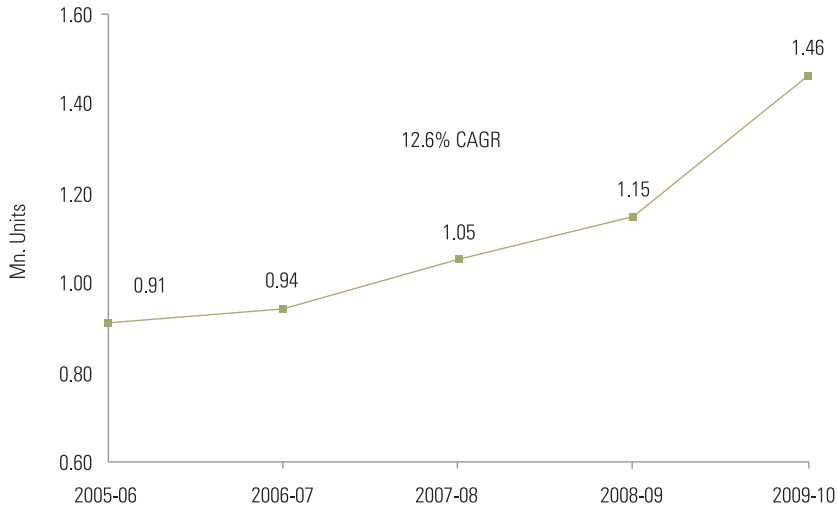
Vehicles based on alternative fuels remain another area of interest for both consumers and companies. Reva<sup>4</sup>, a pioneer in electric cars, remains an exception in the area of electric vehicles in India, although in two-wheelers there are multiple offerings, none of which have as yet taken off in terms of volume. Although both commercial vehicles and passenger vehicles running on CNG are gaining popularity among transport service providers and consumers due to their lower cost of operation, much more needs to be done to improve the fuelling infrastructure before CNG vehicles become more mainstream. This report explores this theme in detail in the section on Green Revolution.

1 1 (mile per gallon) mpg = 0.42 km/l (approx)  
2 National Highway Traffic Safety Administration (NHTSA)

3 OEM websites, KPMG Research  
4 Mahindra & Mahindra (M&M) has recently purchased a controlling stake in Reva



Figure 7: Scooter - Domestic sales growth



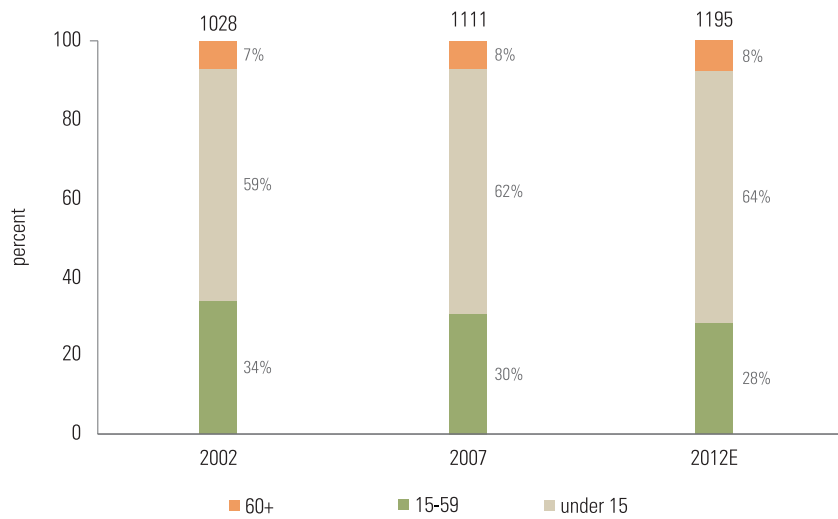
Source: SIAM

### Niche Products

While India remains predominantly a cost-conscious market, profitable niches are available for the products which address specific needs. One example is the growth in the sales of gearless scooters, as seen in Figure 7. Of these, most of the scooters are in the 75-125cc sub-segment<sup>5</sup>, often targeted at young people and women in particular.

The growing population, a significant proportion of which will be of working age over the next decade, is another source of demand to most automobile companies.

Figure 8: India's changing demographic profile (Mn) across age groups



Source: Planning Commission, India



<sup>5</sup> SIAM

The luxury car segment<sup>6</sup> has taken off substantially in the last three years (see Figure 9) and current data suggests that the demand will be sustained in the medium term. While the luxury car volumes are only about one percent of the total passenger vehicle sales in 2009-10, the cumulative annual growth rate (in volume) of nearly 40 percent over the last two years suggests that this share is bound to grow.

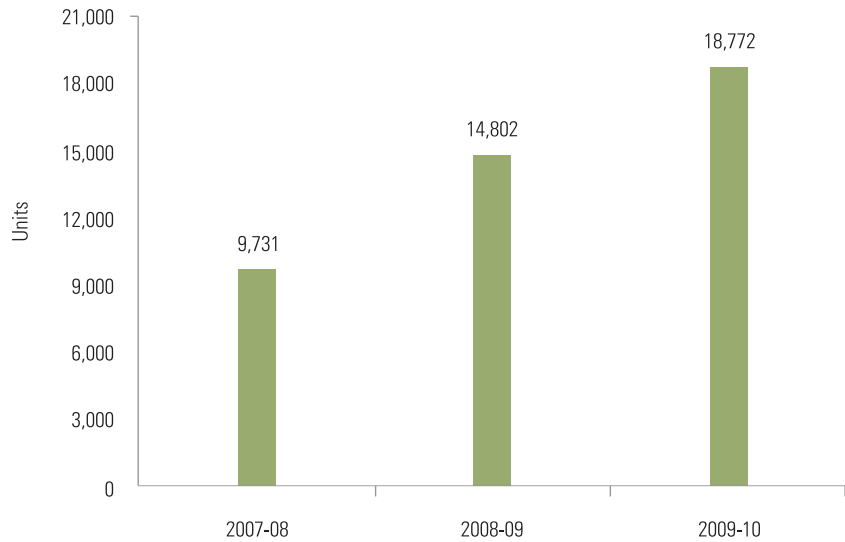
### Rural Market

The automobile industry has yet to fully tap into demand from rural areas. Previously, consumers from these areas would need to go to automobile dealerships in towns and cities for their vehicle purchases. However, in recent years, market players have made overtures to rural consumers, with encouraging sales. Figure 10 shows a gradual but steady growth in demand for passenger vehicles from rural areas, accompanying the growth of the overall segment.

While the Indian automobile industry seeks to double total sales on the back of steady growth over the next decade, these relatively undertapped demand segments (rural markets, youth, women and luxury cars) are expected to play a significant role.

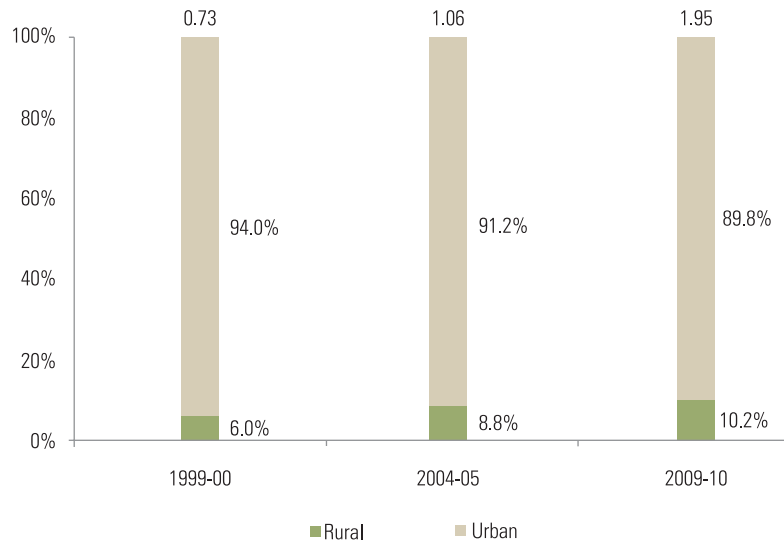


Figure 9: Luxury car sales



Source: SIAM, KPMG Research

Figure 10: Growth in rural demand for passenger vehicles (1.95 Mn vehicles in 2009-10)



Source: Emkay Research, NCAER

<sup>6</sup> Cars costing above USD 32000 (about INR 15 lakh)

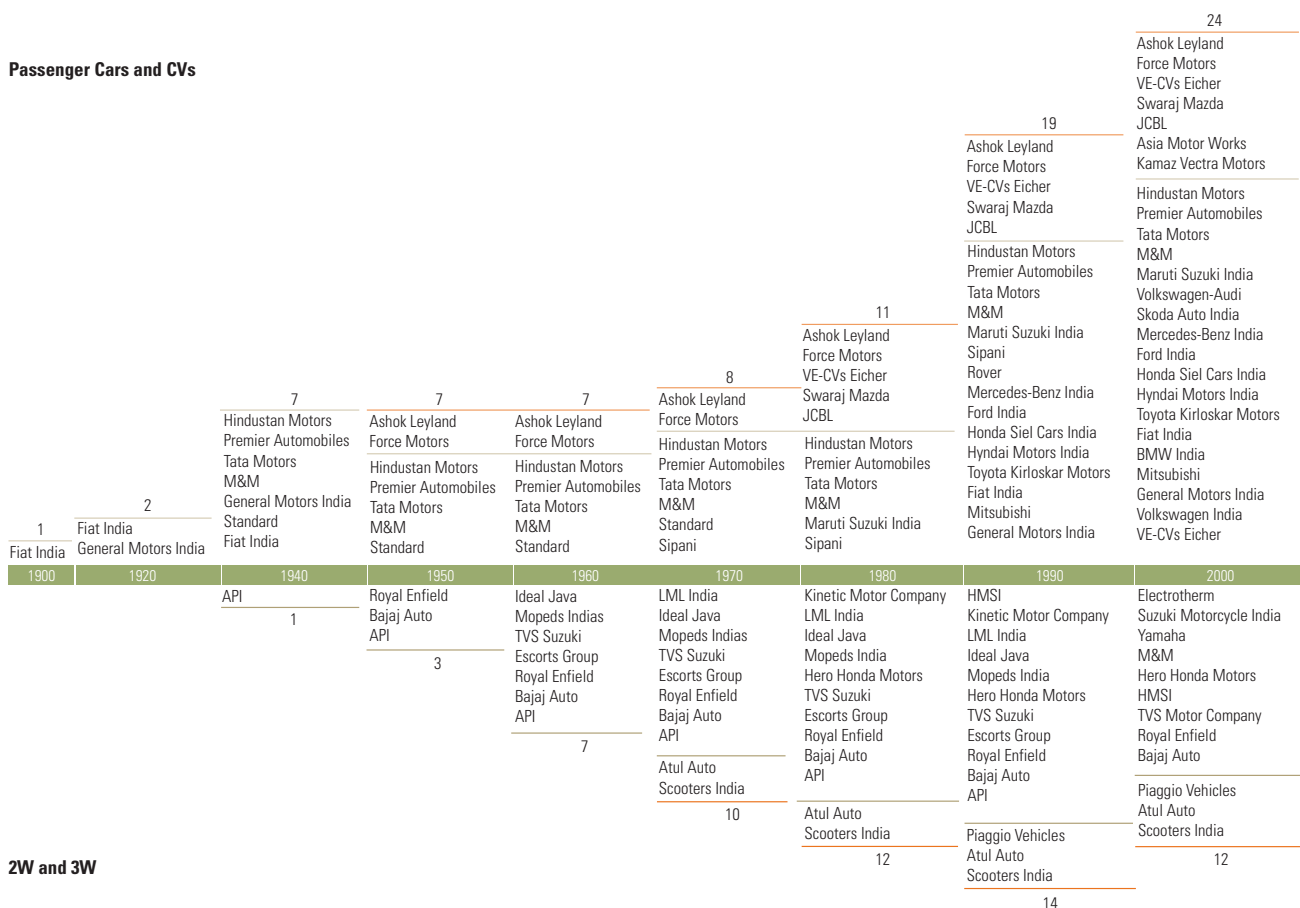
## Consolidation

As India seeks to become one of the world's largest automobile markets, it is interesting to look at its evolution over the years. India's attraction as a destination for automobile manufacturers has been underscored by the number of new manufacturers entering the country over the last two decades. Unlike in several markets, the number of manufacturers has continued to grow in India over the years across vehicle segments.

"Global consolidation is a natural process of business alignments based on technologies and market opportunities," says Daimler's Marc Llistosella. "The Indian market is evolving as the next big opportunity and players from across the world see it as a natural extension of their business domain. And Indian players in the automotive component sector are now viewing the entire global market as an opportunity. With high skill levels and a competitive

environment, they are no longer restricted to viewing India alone."

Figure 11: Automobile Manufacturers<sup>7</sup>



Source: SIAM, Company websites, KPMG Research

<sup>7</sup> Kinetic 2W has been acquired by Mahindra & Mahindra recently



Major acquisitions/ joint ventures like Tata & JLR and VW & Suzuki have enabled OEMs to grow their ranges while taking fewer financial risks. Alliances are playing significantly increasing role in generating economies of scale.

But an alliance must be a marriage of equals, warns Sunil Rekhi, Deputy CFO of Nissan Motor India and Renault Nissan Automotive. “We have enough examples where such alliances haven’t worked, such as Daimler Chrysler,” he says. He cites global OEMs’ high regard for India as a sourcing hub and intellectual pool as the reason why an increasing number are setting up R&D and engineering centers in the country.

Ashok Leyland has found a compatible partner in Nissan to develop light commercial vehicles. Ashok Leyland CFO, K Sridharan sees such technological agreements as a major opportunity for Indian auto firms to not only cater to domestic demand, but also to make deeper inroads into the export market. “More and more players are strategically eyeing India and as a result the industry is exposed to advanced features, quality levels and performance levels,” he notes.

While the passenger car segment has been dominated by three vendors – Maruti Suzuki, Hyundai and Tata Motors (which together accounted for 70 percent of passenger car sales in 2009-10)<sup>8</sup> – the two-wheeler segment is dominated by Hero Honda, Bajaj and TVS Motors (which together accounted for more than 80 percent of two-wheeler sales in 2009-10)<sup>9</sup>. Considering the robust growth the industry is currently witnessing, it is clear that any new entrant would need to demonstrate consistent and clear differentiators to make a play for a leadership position in the Indian market.

The domestic industry has not seen too many mergers or acquisitions in the recent past. Talking about the two wheeler segment, Bajaj Auto Senior VP, Business Development, S Ravi Kumar, does not see consolidation as a likely scenario in the immediate future. “Considering the limited number of players operating in mature markets like India, we do not foresee any consolidation happening,” he said, “in all there will be handful of players who will dominate this industry. People who can’t meet quality and cost expectations will find it hard to come in.”

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<sup>8</sup> SIAM

<sup>9</sup> Kinetic 2W has been acquired by Mahindra & Mahindra recently

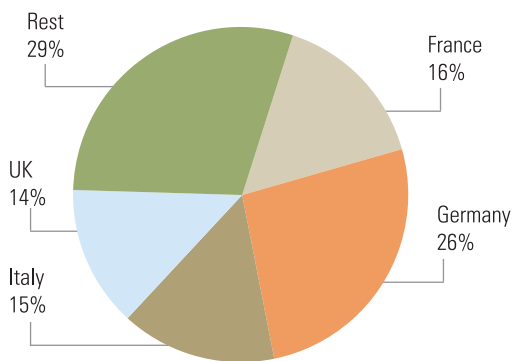


## Consolidation in Europe

Europe has witnessed some dramatic power shifts in the past. Europe has seen four phases of consolidation<sup>10</sup>, beginning with the big shakeouts of the 20s-30s, to the consolidation in the wake of the end of the Second World War in the 50s. Another wave of consolidation began in the 60s, followed by a period of slowing growth leading to the current state of a globalized automobile industry.

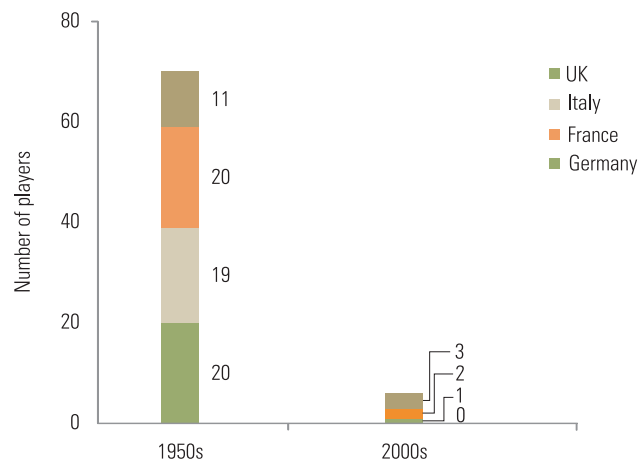
Within four key markets (UK, Germany, France and Italy) which together accounted for more than 71 percent of new car registrations in Europe<sup>11</sup>, the trends have been markedly different, with a significant reduction in the number of manufacturers over the last five decades (see Figure 12).

Figure 12 (a): Share of key nations in new car registrations in Europe for Jan-Dec 2009



Source: European Automobile Manufacturers Association (ACEA)

Figure 12 (b): Consolidation among automobile manufacturers in Europe between 1950s and 2000s



Source: KPMG Research

One of the more interesting scenarios being considered by various industry observers involves the development of super-specialists in the automobile industry akin to the IT industry, with the automobile being treated as a system, with each specialist supplying a sub-system. For example,

- BMW, PSA could be the two engine manufacturers in the car industry like Intel is the predominant supplier of processors to the IT industry, while other manufacturers who would buy engines from it could focus on the automobile's branding and distribution

- Toyota could become the manufacturing services provider of choice to several car manufacturers

In this scenario, a high degree of collaboration may be required among manufacturers who are currently engaged in vigorous competition for market share.

<sup>10</sup> KPMG's "Brand & Ownership Concentration in the European Automotive Industry"

<sup>11</sup> ACEA, Jan-Dec 2009

When compared with the European industry, several observations can be made on the Indian automobile industry from a consolidation perspective:

- The Indian automobile industry is set to continue its growth trajectory, in the medium term, on the back of steady economic growth. Some consolidation or alliances could possibly be expected, driven by the need for access to technology, manufacturing facilities, service and distribution networks:
  - Some evidence of this has already been seen with Fiat's diesel engine being used in Suzuki's vehicles, as well as Tata vehicles
  - Tata is managing the service and distribution facilities for Fiat India
- India is predominantly a two-wheeler market (by volume) today, and given that affordability is expected to continue as a key issue for a large part of the Indian population, this trend is unlikely to change over the medium term regardless of entry/exit of new players
- Consolidation in the form of brands being bought and sold or companies exiting the market are more likely to be exceptions. Furthermore, global developments such as Volkswagen's acquisition of a stake in Suzuki will have their own ramifications for companies in the Indian market. However, it is unlikely that we will see phenomena such as brands/entire companies being bought and absorbed, as has been seen overseas.

- The components sector is "one of the biggest challenges for maintaining growth but also one of the biggest opportunities," according to Ford's Michael Boneham, a view echoed by Daimler's Marc Llistosella, who argues that with high skill levels and a competitive environment, component manufacturers are now viewing the entire global market as potential customers. "India has shown to the world, the high profitability we have here and efficiency which is outstanding compared to many European countries in terms of cost consciousness," he said. "Engineering has a value in India. Society accepts and has a respect for that." Amtek Auto's John Flintham has noted no consolidation in the component industry so far, only "expansion, expansion, expansion." And the Indian market does not appear ready for contract manufacturing, according to Ashok Taneja, Managing Director of Shriram Pistons and Rings, because "the market is growing and there is space for all OEMs to grow."

The medium term outlook for the Indian automobile sector, based on the various demand-drivers as well as the likelihood of consolidation being limited, suggests the industry should have a relatively stable growth in the medium term. However, in the long term, there are two interesting scenarios, both of which are relatively nascent as of date, thus making it difficult to predict how they might shape the industry

- Green vehicles
- Developments outside the automobile sector, such as a growth in alternative mobility solutions.





# 4

## Indian Auto Sector – Long Term





The nature of the long term state of the Indian automobile industry appears fluid, given that globally evolving phenomena such as the rise of greener, hybrid vehicles are yet to take off in India. However, the Indian automotive industry has scripted a different story in the development of greener vehicles with the rise of CNG as a popular option among consumers. In this context, we discuss the following trends

- Green revolution
- Mobility revolution.

## Green revolution

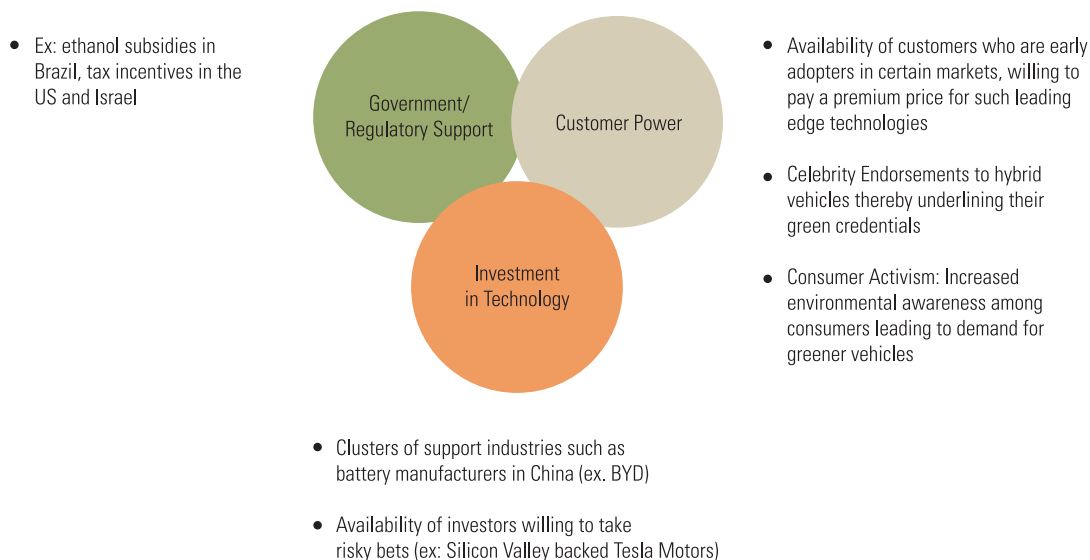
In July 2010, Toyota announced the sale of its 200,000<sup>th</sup> Prius<sup>1</sup> in Europe, as well as the tenth anniversary of its launch of the Prius.

It is expected that Toyota will sell 2 million Prius cars worldwide soon. The milestone is all the more remarkable given that Toyota sold its 100,000<sup>th</sup> Prius in Europe only about two years ago, underscoring the growing importance of electric vehicles in the green sector.

Many manufacturers and models (GM's Volt, Ford's Focus RV and Nissan's LEAF among others), despite being relative latecomers to the green sector, have tried their best to catch up with Toyota and Honda. Not everyone has taken the plug-in hybrid route. Even niche manufacturers such as California-based Tesla<sup>2</sup>, with offerings such as the Roadster, have enlivened a space which saw its first prototypes emerge decades before the price of gasoline was even a concern.

Commercial vehicles, however, have so far not seen the intensity of product development witnessed in passenger cars. However, the commercial vehicles sector has seen vehicles developed based on alternative fuels. From vehicles developed to handle ethanol-based fuels in Brazil, to CNG<sup>3</sup> buses in India, several OEMs have ridden the green bandwagon.

Figure 13: Drivers/Critical Success Factors for Green Vehicle Development Globally



Source: KPMG's The Indian Automotive Industry, 2010.

1 www.just-auto.com

2 Silicon Valley based investments

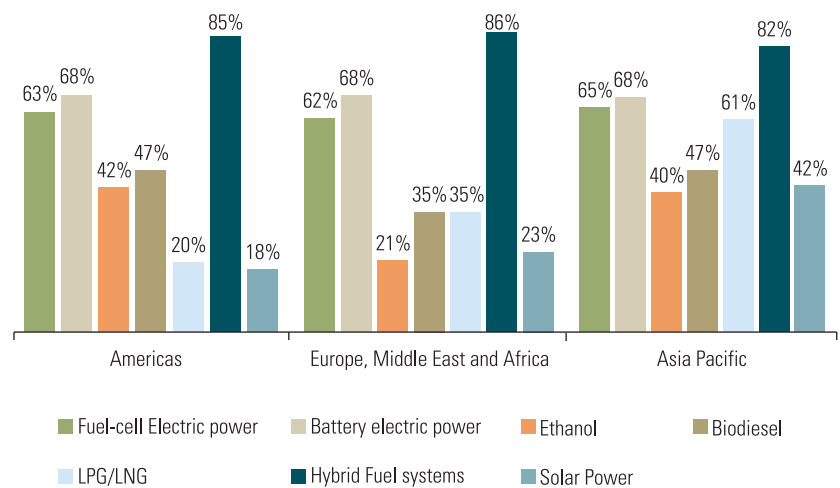
3 CNG - Compressed Natural Gas



Globally, countries which have taken the lead in developing green vehicles (US, Germany, Israel, China, France and Brazil), have all seen significant government involvement. Furthermore, the availability of investments in unproven technologies, as well as clusters of support industries, have ensured that the sector has sustained innovation. In the early years of hybrid cars in the US, endorsements by celebrities is believed to have boosted the cars' popularity.

Interestingly, in KPMG's Global Auto Executive Survey 2010, most industry leaders seemed to agree on hybrid technologies being the most important alternative fuel technologies, followed by battery electric power. This consensus was almost uniform across regions, despite regional differences in the popularity of vehicle types and segments.

Figure 14: Key alternative fuel technologies in the future - percent of executives who considered it important



Source: KPMG Global Auto Executive Survey 2010

## Green Vehicles in India

As with conventional automobiles, the Indian industry has taken a path different from that of the global industry in the development of green vehicles. The development of cleaner vehicles in India began with a regulatory push for CNG buses and three-wheelers in New Delhi more than a decade ago. In all other segments of the automobile market, demand has grown largely based on customer awareness and a pull for products motivated largely by perceived economic benefits. For instance, LPG kits were available in the market more than a year before the first entrant in the field, Maruti Suzuki, introduced factory-fitted vehicles in 2004. In recent times, electric two-wheelers have ridden on the back of customer demand for vehicles with lower running costs, as well as some incentives to users in the form of little or no duties on electric vehicles (and parts) in areas such as New Delhi.

This lack of technological consensus may be hindering the creation of an adequate green infrastructure, according to Ashok Taneja, Managing Director of Shriram Pistons. “Each OEM currently seems to be pursuing multiple technologies such as CNG, bio-fuel, hybrids, hydrogen, fuel cells, Plug-ins or EVs,” he says. It is like hedging bets, not knowing which technology will eventually prove successful. “When there is consensus it will have to be a public-private partnership because the government alone doesn’t have the capacity to build the infrastructure.” He argues that the government must bring manufacturers on board and finalize a 10-20 year blueprint for the introduction of greener vehicles.

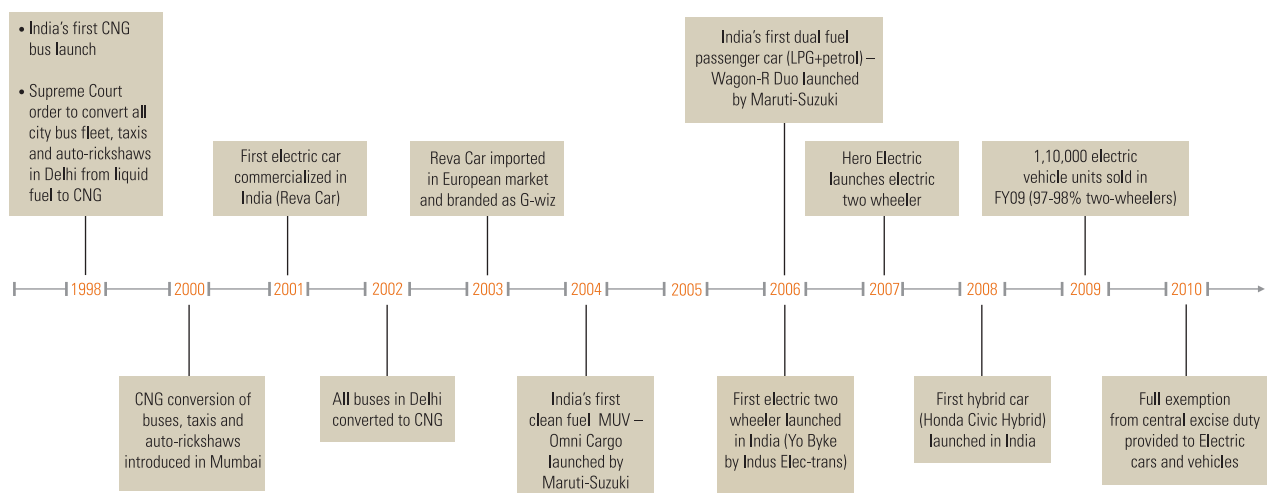
Nevertheless, the Indian auto industry today seems to be evaluating two paths in its move towards greener vehicles:

- CNG/ Dual Fuel<sup>4</sup> Vehicles
- Electric/ Hybrid Vehicles

## CNG/Dual Fuel Vehicles

This part of the industry has developed largely based on legislative and judicial activism and the subsequent availability of CNG fueling outlets across major parts of the country. As shown in Figure 15, the government ordered the conversion of existing diesel/petrol-based public transport vehicles (buses, taxis, and auto-rickshaws) to CNG in several cities including New Delhi and Mumbai, in response to growing concerns over emissions.

Figure 15: Key Milestones in Green Vehicles in India



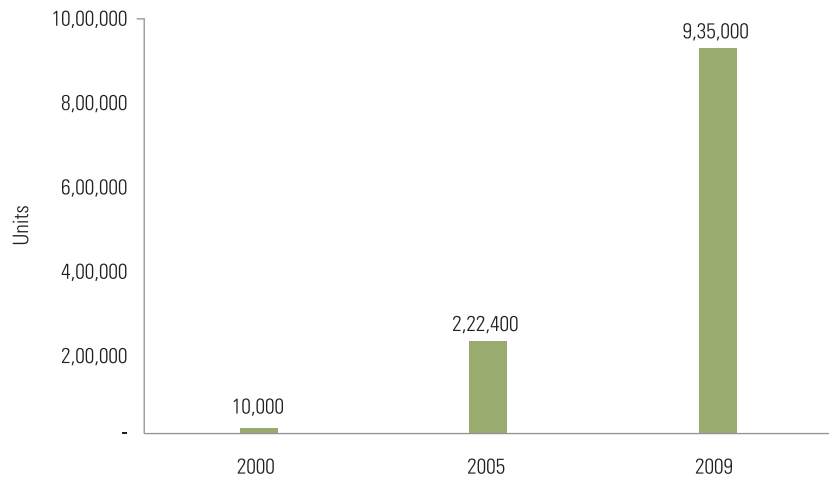
Source: KPMG Research, Company Websites

<sup>4</sup> With one fuel being CNG/ LPG



While there is debate over the effectiveness of CNG in reducing pollutant emissions, there seems to be support for CNG-based vehicles in New Delhi<sup>5</sup>, and sustainable urban transport in other cities (Mumbai, Ahmedabad, and Surat)<sup>6</sup>. Furthermore, other theoretical studies also support the introduction of CNG buses in place of diesel as an effective method in reducing emissions<sup>7</sup>. India has the world's fifth largest number of natural gas vehicles<sup>8</sup>, amounting to a little less than a million vehicles.

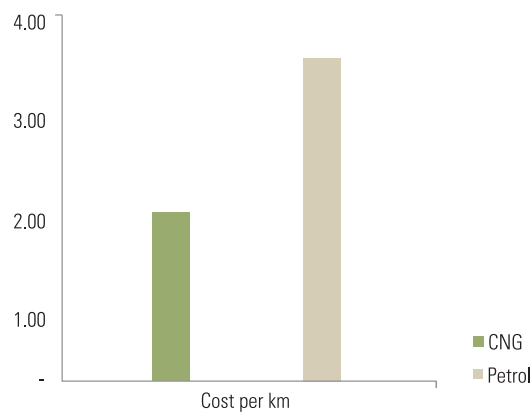
Figure 16: Growth of CNG Vehicles in India



Source: International Association for Natural Gas Vehicles

It is believed that at least 5 percent of new car buyers opt for a CNG variant where available. This could grow in the future as the demand increases for vehicles with lower running costs, although currently most LPG/CNG variants of passenger cars cost about INR 15,000 to 50,000 more than their conventional counterparts<sup>9</sup>. The higher purchase price of dual-fuel cars is normally compensated in less than two years based on cost per km, because dual-fuel cars offer up to 50 percent savings<sup>10</sup> based on current prices of petrol and CNG. The increasing availability of fueling stations in cities and on major highways is also encouraging sales. The state of Gujarat is a case in point on CNG, accounting for about a fourth of all CNG vehicles in India in 2009, while having only about a third of the 560 CNG refueling stations<sup>11</sup>.

Figure 17: Comparison of Cost/km for CNG and Petrol



Note: Assumptions of mileage of 12 km/kg for CNG and 13 km/litre for petrol for a sub 1200 cc engine car, Rates as in Delhi in May 2010

Source: KPMG Research

5 Narain Urvashi, Krupnick, Alan. 2007. The Impact of Delhi's CNG Program on Air Quality, Resources for the Future

6 Rayle, Lisa, Pai, Madhav. 2010. Urban Mobility Forecasts: Emissions Scenarios for Three Indian Cities

7 Takeuchi, Akie et al. 2007. The Impact of Policies to Control Motor Vehicle Emissions in Mumbai, India. Journal of Regional Science

8 International Association for Natural Gas Vehicles, Dec 2009

9 Various OEM product launch announcements

1 USD is about INR 46.5 (xe.com) as of 26 July 2010

10 KPMG Research. Assumption of 20,000 km of travel per year per car

11 Ministry of Road Transport and Highways, Infraline, KPMG Research and Analysis

## Electric/Hybrid Vehicles

Battery powered/plug-in hybrid electric vehicles (BEV/PHEV) have continued their steady growth worldwide, despite accounting for only about 1 percent of all vehicles sold in 2009<sup>12</sup>. In India, electric vehicles have just begun making some inroads into the market. In passenger cars, there is only one established domestic manufacturer, Reva, whose sales account for less than 1 percent of all passenger cars sold in India. However this could change soon with Mahindra & Mahindra's (M&M) acquisition of a majority stake in Reva.

In the two-wheeler market, an electric scooter is available for less (about USD 600) than a conventional scooter (about USD 900)<sup>13</sup>. Soon, Indian electric vehicle manufacturers are expected to launch electric motorcycles. Given that motorcycles account for more than 80 percent of all two-wheelers sold in India, the introduction of electric motorcycles could have a significant impact on the market for electric vehicles. However, electric two-wheelers have seen a recent reversal of fortunes, with sales dipping from a high of more than 26,000 vehicles in 2008-09 to around 3,000 in 2009-10<sup>14</sup>, attributed by industry sources to the rush of cheap, but low-quality vehicles which flooded the market in 2008-09 but then were subsequently rejected by consumers.

Arun Pratap Singh, Senior VP of electric vehicle business Electrotherm, argues that this was partially due to a huge influx of low cost Chinese models which had quality constraints. "A lot of fly-by-night companies had started operating in India who sold inferior quality models at cheap prices but did not provide any service support," he says. "As the customers became aware,

these companies had to shut up shop resulting in a decline in numbers. As a result, the entire electric vehicle industry has earned a bad name and because of this the industry overall witnessed fewer sales in this segment. However, things are changing now, with the introduction of new models, Electrotherm is seeing growth in electric two-wheeler sales month over month" He is also expecting 2010 numbers to bounce back on the strength of a service support network being developed to address any customer problems.

Electric/hybrid commercial vehicles are mostly in the experimental stage at the time of writing so it is not yet clear how this industry will shape up in India. Daimler's Marc Llistosella suggests the move towards greener commercial vehicles is currently limited to the major metropolises because consumer activism is still gaining momentum.

"Post hybrid, there are trials and errors in the industry because no one knows what will happen," he says. "There's no blueprint,

which makes it both interesting and challenging. There are different theories but nobody has the one solution. In discussions at the start of the century, hybrid was called a 'bridge technology', in other words it was never the final destination. 5, 10, 15, 20 years, how long will the next stage take? The industry still has to define a clear path."

## Other Fuels

As in Brazil, where more than 90 percent of new vehicles sold can run on either ethanol or gasoline<sup>15</sup>, India has been exploring the prospect of reducing its dependence on crude oil. There are mandatory blending requirements for ethanol and the government has announced a policy for biofuels (such as biodiesel/biopetrol) from various sources. However, none of these have taken off in a sustainable manner.

As with any developing market trend, greener vehicles face several challenges to their growth in India (see Figure 18). Addressing them would help expand the market multifold.

Figure 18: Challenges for Green Vehicles

### Customer Power:

- Fuel economy is the primary driver in the Indian market
- Range anxiety for customers of both electric and CNG vehicles

### Government/Regulatory Support:

- There is no national policy for electric vehicles/CNG vehicles (the state of Delhi has incentives)
- Biofuel/ethanol pricing
- Coordination among various government agencies, such as the ministries of petroleum, forests and environment, agriculture, etc.

### Fuelling/Charging Infrastructure:

- Low number of CNG pumps (about 560) vs. about 38,000 conventional fuel (petrol/diesel) pumps – as of April 2010
- Inadequate number of charging stations and that too limited to select cities

Source: Infraline

<sup>12</sup> KPMG Research

<sup>13</sup> Yo Bike prices for electric scooters and Honda scooter prices (both in Mumbai) have been used for comparison

<sup>14</sup> As tracked by SIAM. However there seems to be a parallel segment of vehicles with lower speeds including Chinese imports that aren't tracked by SIAM, which have achieved sales of more than twice that the number tracked by SIAM. Source: Various news reports on Electric Vehicle Sales

<sup>15</sup> Reuters

In the context of fuelling/charging infrastructure being a significant hurdle to the growth of greener vehicles not just in India but also globally, the following case study of Better Place, one of the promising start-ups in the electric vehicle sector, illustrates how the green sector can be encouraged to grow.

### Case Study of Better Place<sup>16</sup>

Better Place is an innovative start-up which plans to position itself as a provider of EV mobility solutions to the consumer. It is experimenting with multiple business models including battery exchange points, charging stations and a suite of in-car services to boost the driving experience. It is working in collaboration with battery and automobile OEMs, governments/policy makers and investors. It has raised around USD 350 million in funds.

Better Place aims to launch commercial operations in Israel and Denmark by the end of 2011. Several key projects have already been undertaken:

- It launched the first of a planned 500,000 battery charging stations in Israel in Dec 2008
- In February 2010, it announced the signing of 92 corporate fleet owners, as well as a partnership with Dor Alon (one of Israel's leading gas station operators) for battery switch stations at Dor Alon's facilities
- It is partnering with Tokyo's largest taxi operator, Nihon Kotsu, to introduce electric taxis with switchable batteries in Japan. This project is being funded by Japan's Ministry of Economy, Trade and Industry's Natural Resources and Energy Agency.
- It has signed an MoU with Chery Automobile Co, China's largest independent auto producer and exporter, to jointly develop switchable-battery EV prototypes with the goal of securing regional Chinese government EV pilot projects.

Some industry players believe that the automotive industry will make most headway in addressing green concerns not by adopting radical new technologies but by optimizing the performance of conventional engines.

Ford India's Michael Boneham says alternative fuel-based cars will happen eventually, but the process will be gradual because fuel cells and solar cells are unavailable within the pricing parameters of most cars sold in India. "From a Ford perspective we're looking at technologies for improving the performance of internal combustion, such as EcoBoost. We could perhaps see manufacturers bringing in small and interesting niche segmentation at high cost for hybrid vehicles initially, and you'll

see other niche alternative-fuel based cars such as electric. But the issue isn't just auto manufacturers investing in this market – where do people with electric cars recharge their batteries in countries where power shortages are so prevalent?" he says.

This does not deter Electrotherm's Arun Pratap Singh, who says that his company is currently focusing on demographic groups with lower mobility needs, such as women, young people and the elderly. "Once the company has technology to enhance the speeds of the vehicle it would like to target other customer segments also," he says. "We are currently working on powertrain development which could achieve a speed enhancement of the vehicle."

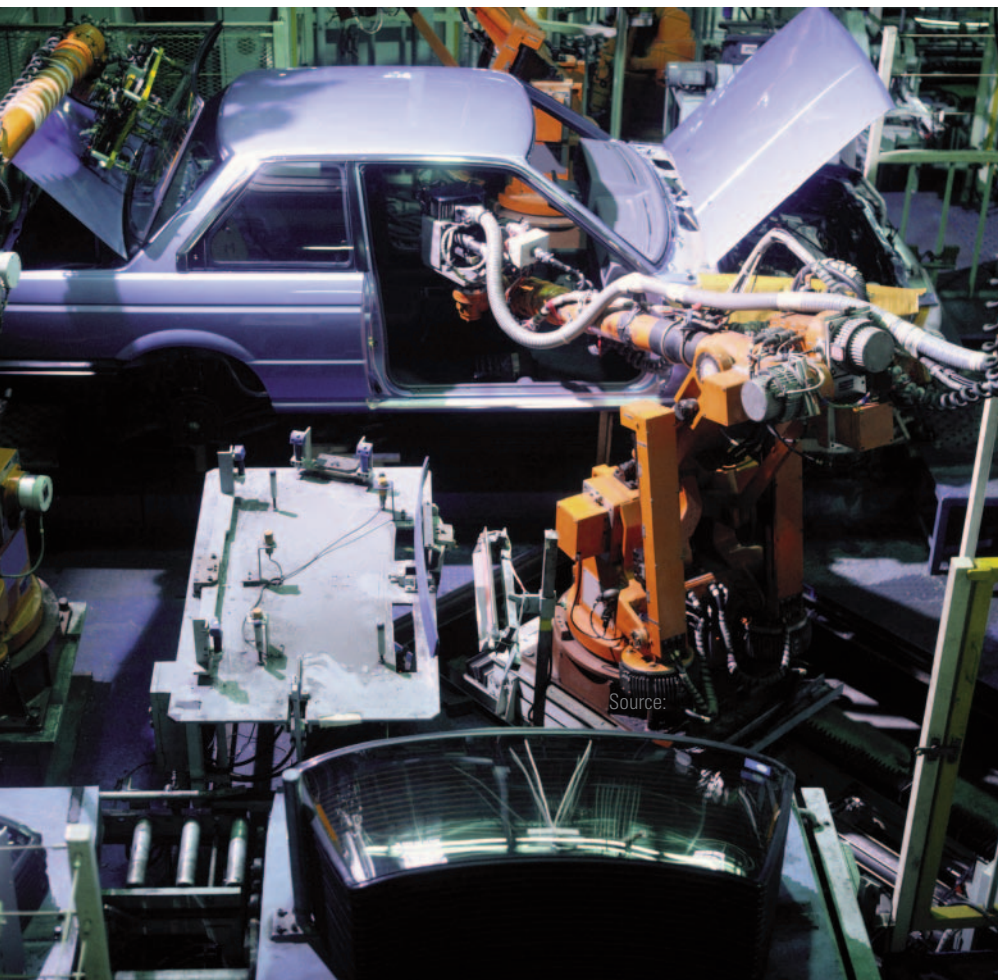
Honing the technology of engine management system is the primary focus concern for many manufacturers. Unlike in the European markets, in India, focus on environment is less pronounced and is not a purchasing consideration for many buyers.



This is a stance echoed by Bajaj Auto's S Ravi Kumar, who stresses that India's two-wheelers already produce less emissions than similar vehicles elsewhere in the world. "We'll keep improving fuel efficiency on regular internal combustion engines," he says, "Beyond that, switching to alternate technologies will happen only when battery cost is slashed to 0.5 to 0.25 (times) of current levels. Only then will it come within the grasp of millions rather than just a few people."

Ashok Leyland's K Sridharan, citing his company as an early pioneer of CNG and battery-powered vehicles, is more confident of manufacturers' readiness for green technologies. "The level of preparedness on the part of OEMs for greener vehicles is very high," he says. "It just needs government support. For example, in the case of the Commonwealth Games, when the government mandated special low-floor CNG buses, the OEMs were able to deliver."

Despite what seem like significant challenges to the Indian automobile industry's green future, there are several potential opportunities not just for automobile manufacturers but also for supplier bases to ride the green revolution as detailed in the box below.



#### Opportunities for Indian Automotive Industry in Green Vehicles

##### Green Vehicle Export Hub

- Leverage expertise with small cars (especially dual fuel cars)
- Make significant investments

##### Research and Development Hub

- Extend experience for leading OEMs and engineering companies to the area of green technologies
- Global alternative energy companies (for ex., Suzlon) could become new leaders

##### Sourcing Hub for Parts for Green Vehicles

- India is already one of the world's leading sources for parts for conventional automobiles
- Vendors could leverage their existing relationships, to supply parts for green vehicles

## Mobility revolution

Globally, OEMs recognize the potential of other modes of transport to complement traditional private vehicle use. Alternative transportation represents another area of interest for the automobile industry, but opinion is divided on whether it represents an opportunity or a threat.

In India, the share of public transportation (excluding quasi-public transport like auto-rickshaws/taxi services) has declined while private vehicle ownership has been booming, driven by growing urbanization and increased affluence<sup>17</sup>. A comparison of two studies (1994-RITES and 2008-WSA) clearly shows (Figure 19) there has been a decline in the share of public transport across the cities.

Figure 19: Public Transport Share in total transportation



Source: Study on Traffic and Transportation Policies and Strategies in Urban areas in India, May 2008, WSA, Ministry of Urban Development

The alternate mobility revolution is just taking off in India. As shown below (Figure 20), there are several alternatives to private transportation/personal mobility that need to be closely monitored by industry players to identify opportunities and risks.

Figure 20: Alternative Mobility options

- Investments being planned in urban public transport infrastructure like the metros in 8 cities including Mumbai, Bangalore, Ahmedabad, Jaipur among others in the near future.
  - These 8 cities together account for over 60% of vehicle population and 50% of India's population
  - Bus Rapid Transit System (BRTS) - also known as the High Capacity Bus System (HCBS)
  - BRTS Proposals are in various stages of appraisal and implementation in Ahmedabad, Bhopal, Delhi, Indore, Jaipur, Pune and Vishakhapatnam
- Metros/BRTS

Fleet Taxis/Buses

Rural Mobility

- New international airports in Bangalore and Hyderabad
  - Radio taxis in Bangalore and Delhi are estimated to be over 1000-1500 each
  - Additional investments expected by the respective Road Transport Corporations
  - A significant part of rural India remains unaddressed by the rail network
  - Inter-system mobility beyond existing networks from urban to rural areas

Source: KPMG Research

<sup>17</sup> Study on Traffic and Transportation Policies and Strategies in Urban areas in India, May 2008, WSA, Ministry of Urban Development

In the future, it is believed that planned investments by both the private and public sector will require more interaction between public transport options and private vehicles (driven by the introduction of metros, Bus Rapid Transit Systems (BRTS), fleet taxis/buses and increased rural mobility). Currently inter-system mobility has not been a significant area of focus and is therefore largely consumer driven and unregulated.

Ashok Leyland's K Sridharan is hopeful, seeing mass rapid transport systems as a necessity which will impact the automotive industry by providing opportunities to participate in solutions. "One example could be coach sharing in airports/railways being implemented by OEMs," he says. "There's a lot of scope for different solutions to enhance the connectivity networks in India. Ashok Leyland is already working on these lines."

While there seem to be significant opportunities for automobile players to exploit, there are some clear challenges ahead, most notably in infrastructure. Most large cities in India have outgrown their planned sizes and are unable to adopt alternative transport systems in a meaningful timeframe. For example, a BRTS requires dedicated fast lanes for buses, which is very difficult given the existing congestion on the roads of cities such as Mumbai.

Limited expansion possibilities will mean an integrated transport system becomes a necessity. This need will be more pronounced, once all options to enhance road transport like building flyovers etc are exhausted. However, industry observers believe that such solutions/ technologies are likely to be developed outside the automotive industry and automotive

companies' immediate focus is likely to be on making their cars greener.

Bajaj Auto's S Ravi Kumar concurs: "Business houses, like Tata, Bajaj and M&M, will go for it only if they want to enter that business and there is business merit in the proposition," he says. "It falls outside the scope of auto industry's backward- forward integration perimeter, auto guys are auto guys. Bridge and road guys are bridge and road guys."

Vehicle manufacturers are certain to become embroiled in the revolution even if their involvement is initially peripheral. Nissan India's Sunil Rekhi says: "The Indian automotive industry will play a role in providing feeder services to the different modes of public transportation in the form of supplying bus services and fleet services."

Clearly, given the huge transportation needs of the future, an increasing proportion of the population may shift their allegiance towards public transport, thereby reducing the power of automobile manufacturers.

The following case study of a metro rail corporation in India highlights an opportunity in which mass mobility providers could lead the way in transportation solutions in a future scenario. In such a case, neither vehicle manufacturers nor the originators of the fuels that those vehicles run on, would dominate.

### Case Study of DMRC<sup>18</sup>

The Delhi Metro Rail Corporation (DMRC) was born in response to the need to decongest the city's roads due to a rapidly growing vehicle population.

The DMRC currently transports more than one million people every day, roughly 6 percent of the city's population. While it has been in operation for about five years, its popularity can be gauged from the fact that it now links/will be soon linking all three key territories within the National Capital Region – Gurgaon, Noida and Faridabad. These areas have among the highest car densities per 1,000 population in India. Delhi's density of four-wheelers per 1,000 population is nearly eight times the ratio for the country.

Although DMRC has seen a multifold jump in its traffic, from about 150,000 at the time of its introduction, the numbers are still well below the planned estimates of more than three million daily users.

As Figure 21 shows, while the Delhi Metro's passenger traffic has grown at a healthy rate, Delhi's rate of increase in private vehicle numbers (increase of about 0.7 mn) compared to its population growth (increase of about a million) between 2005-06 and 2007-08, indicates that in the near-term road capacity might become a constraint for vehicle sales growth.

<sup>18</sup> DMRC website, KPMG Research

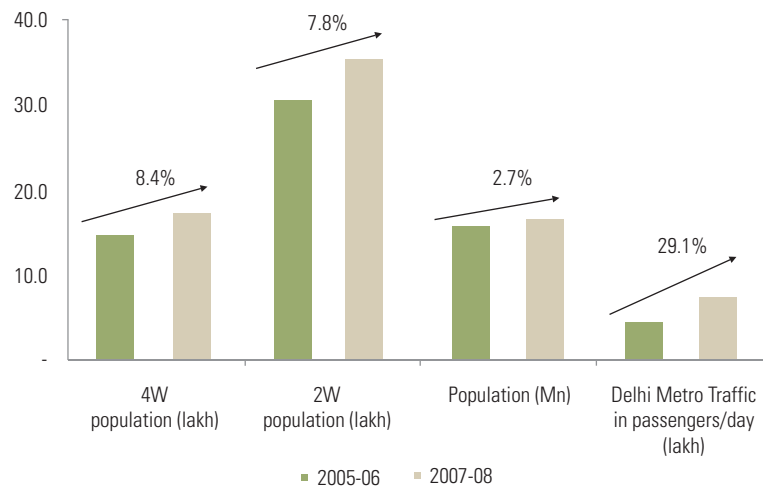


One reason the Delhi Metro has not dampened car sales is the socio-economic statement of car ownership, according to Ford India's Michael Boneham. "Urban Mass Mobility Schemes are an absolute must, but I don't see them impacting the growth of the automotive market because they have to go hand-in-hand," he says, "There's no abatement in the demand for vehicles because of economic demographics – one of the key identifiers of success in India is a person buying a four-wheeler, and that will continue significantly for the foreseeable future. It's a key part of the Indian psyche."

Growing prosperity will keep the automotive market robust, agrees Bajaj Auto's S Ravi Kumar. "People are enjoying their lives," he says, "They want to buy bikes and cars. Many more are getting into the affordability threshold just...If you tell them to sit in the Bombay metro, that might not cut the ice. I don't see a reduction in auto sales because of this shift to Urban Mass Mobility Schemes."

Amtek Auto's John Flintham agrees demand will remain healthy, despite predicting a booming rail sector in the 'golden triangle' of Mumbai, Chennai and Delhi. "If you look at a westernized country such as London where there is a public transport infrastructure, although people in the centre probably don't buy many cars, a lot of other people in the city will," he says. "I think the overall demand is still strong. And I think some of the investment in the rail structure within India will actually make it more viable in terms of becoming an export nation."

Figure 21: Delhi: Population Growth vs Vehicle Population Growth



Source: Economic Survey of Delhi, DMRC, KPMG Analysis

Based on current trends, in terms of both greener vehicles and alternative mobility solutions, India is perhaps five years or more, away from these trends becoming mainstream. However, this could rapidly change based on regulatory interventions or global political/economic turmoil akin to the aftermath of the 1970s oil shock or the Gulf war, accelerating transformation of the Indian automobile industry.

In the context of lead time for implementing new strategies and developing new vehicle platforms, players would do well to begin planning for that evolving landscape now.







# 5

## Conclusion





India's automobile industry is poised at the start of an exciting phase of growth, not all of which may derive from manufacturing conventional fuel-based vehicles. Various possibilities ranging from developing vehicles based on alternate fuels to collaborating with some-time rivals, have the potential to open fresh avenues for growth.

In order to capitalize on the emerging scenarios in the future, the following are a few key action points for each of the industry's key stakeholders:

## Policy Makers

- India has no duty benefits for even hybrid cars, which need to be imported due to low volumes. If India's automobile industry wants to play a role in the global arena for alternative fuel-based vehicles, such limiting measures need to be reexamined and an appropriate redesign of the framework needs to be enacted immediately
- While global companies are pursuing innovations in third and fourth generation biofuels, India is yet to decide on a purchase price for the fuel. Such a delay in key policy decisions, which have the potential to unlock innovation, need to be remedied based on the recommendations of industry associations/participants
- Demand for nascent technologies and fuel efficient cars needs to be encouraged by offering consumers incentives to adopt these products, such as an expansion of the policy of little or no duty being payable on electric vehicle parts. This can in turn spur innovation for better products. Likewise, manufacturers could be encouraged to commercialize their

green technologies, which are currently expensive and under-utilized by the market, by being offered subsidies where appropriate

- Increase dialogue with manufacturers and oil marketing companies to establish a better infrastructure for greener vehicles. The government should consider finalizing a short, mid and long-term blueprint for the development of this infrastructure, encompassing elements such as battery recharge stations or CNG pumps, through public-private partnerships
- The government should stimulate debate on how the public and private sectors can collaborate on the establishment of Urban Mass Mobility Schemes. Manufacturers could become key players in terms of developing new technologies, or inter-system mobility.

## Industry Participants

- The market for greener vehicles opens up a whole new world of possibilities for Indian companies, even outside the automobile sector (such as leaders in renewable energy), to make a global foray
- A greater focus on export opportunities could tap into a worldwide market hungry for green technology, which India can provide cost-effectively and to global standards. Business models of global green vehicle manufacturers should be examined to see how mass-market penetration can be enhanced
- Collaboration is likely to be the theme for the next decade as new markets and products are created by companies forging previously unimagined partnerships. Companies will need to think beyond existing business models.

Concentrations of resources and technical ingenuities may be vital to generate workable economies of scale. There may be merit in greater specializations, such as that witnessed in the IT industry, to simplify processes and reduce investment need

- Across all vehicle types, under-served demographics such as young people, women and rural customers could be targeted by making greater overtures to these markets and by improving distribution networks
- Better links should be forged with support industries such as battery manufacturers to help drive down costs of making and maintaining green vehicles
- Manufacturers should form a greater consensus than exists at present on the most appropriate focus for emerging green technologies. The industry is slightly fragmented currently, with numerous options being explored ranging from battery power to hybrid fuels, from biodiesel to LPG.

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