

What will drive your car?

*The passenger car industry continues to be one of the biggest contributors to GHG emission globally. Consensus on restricting their tail pipe emissions can have a major impact on the future of the internal combustion engine which has been the motive force for this industry for over a century. However, even if India were to adopt similar norms, its domestic passenger car industry is likely to witness less turmoil as compared to its global peers till 2020 say **Arindam Chakrabarti** and **Vikas Agrawal** of Tata Strategic Management Group.*

In recent times, the passenger car industry has been agog with high decibel launches of plug-in hybrids and electric cars. Motor shows across the globe have featured them. Proposed collaboration between Reva and General Motors for an electric Spark has grabbed global media attention. Overall, there is heightened interest in emerging propulsion technologies.

In all this hype, how will the Indian car market evolve? What will you drive in the next decade?

Impact of new GHG emission norms

Reduction in GHG emission has been at the cornerstone for development of new propulsion systems. EU has stipulated a fleet average emission of 130 gram of CO₂ per km of travel from new light duty vehicles registered in 2015. This figure shrinks to 95 grams by 2020. With similar stringent norms likely to be legislated across most developed markets, sustaining a continuously decreasing fleet average emission levels is becoming imperative for car manufacturers.

Emerging consensus on the way forward

It is commonly accepted that there is a limit to which tail pipe CO₂ emissions can be minimized by fine tuning the internal combustion engine (ICE) alone. Alternative motive force is required to achieve zero tail pipe emissions. This is threatening the absolute hegemony of ICE powered cars and the next decade may witness a battle for its survival.

For long, major car manufacturers remained divided in their approach to find an alternative to ICE. After having spent heavily on evaluating multiple options that included fuel cells, compressed air, hybrid, full electric vehicles etc. the industry finally seems to

have arrived at a consensus that battery powered propulsion is the way forward.

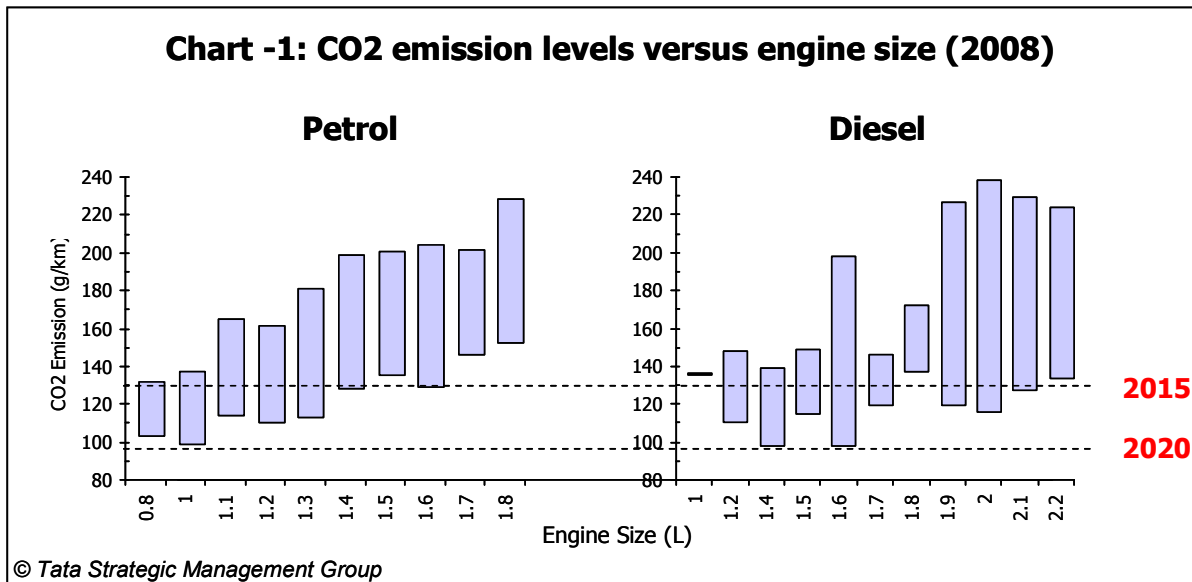
Recent developments have started demonstrating that it is possible to produce high-energy density lithium ion batteries. With the concerns on charging infrastructure also getting addressed by new business models like First Place, alternative propulsion system appears to be is round the corner.

Does this signal the end of the road for ICE powered cars?

Will all new cars registered in EU in 2015 be battery powered to varying extent? It appears unlikely. While hybrid/ electric cars will enter the market, their rate of introduction may be slow. This is because concurrent innovations in ICE and related vehicular technologies too have been delivering encouraging results. Low emission levels have been achieved at substantially lower cost.

Analyses of empirical data on CO₂ emission from new cars registered in UK confirm this. In 2008, nearly 16% of all new ICE powered cars registered in UK conformed to the 2015 emission requirements. **Chart-1** below shows that despite significant variations in overall emission levels among similar sized ICE engines, certain variants had emission levels lower than 130 grams per km suggesting that it is possible to achieve much lower emission levels with existing propulsion system by incorporating the latest developments in ICE and related vehicular technology.

While these developments may not be enough to ensure that all cars of varying footprints meet 2015 norms, it is increasingly becoming evident that a range of cars among them will qualify. In fact, further



successes in ongoing initiatives like dieselization, turbo-charging, downsizing, light weighting etc. can make this range even compliant to 2020 norms.

Likely rise of hatchbacks

Analyses show that this range of cars predominantly comprises of minis or super minis. They are largely hatchbacks powered by petrol engines up to 1.3 liters (or up to 1.6 liter in diesel) and have small foot prints. Such cars account for around 17~18% of new cars sales in Europe. Inferior compliance levels from use of pure ICE power will require bigger cars to adopt either hybrid or fully electric propulsion systems by 2015.

It is evident from the chart that hatchbacks can continue to be powered by next generation ICE and still meet emission requirements beyond 2015. But, presence of large cars will ensure that multiple propulsion technologies co-exist in the next decade. Car makers will have the option to choose among next generation ICE, hybrid or fully electric propulsion systems to power their new launches. The future mix of cars with competing propulsion technologies, however, remains a topic of debate.

The current high cost of lithium ion battery may become a major hurdle to greater penetration of hybrid or electric cars. Government subsidies or tax breaks may be required in their initial years to lower acquisition costs till battery prices become economical. Further, the adoption of hybrid/ electric propulsion will depend significantly on the willingness

of car owners to go for a battery change or recharge after every 100 odd miles.

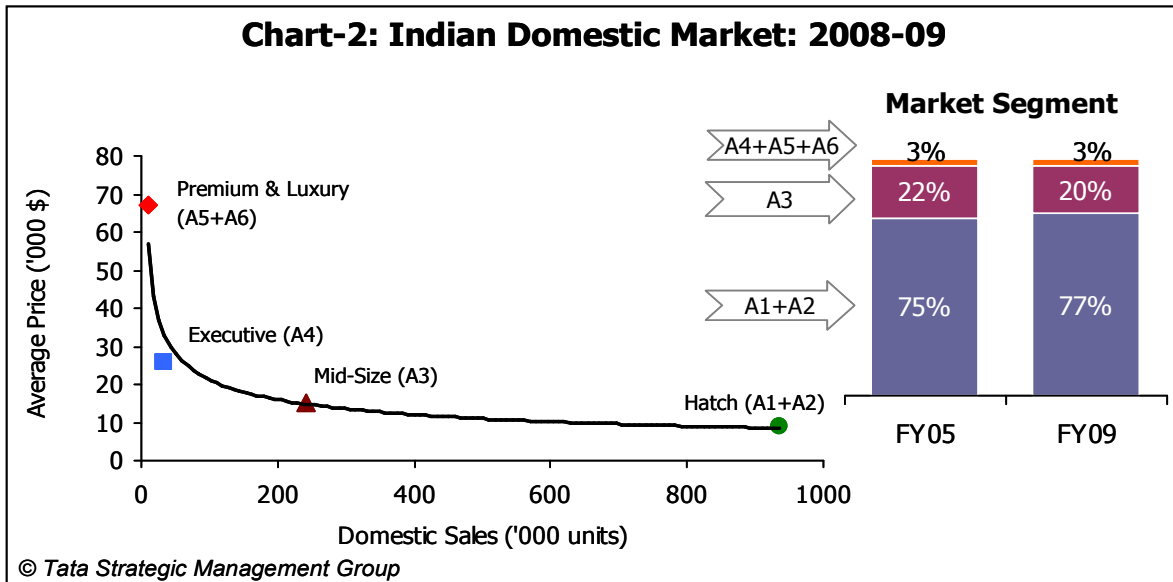
In the absence of significant Government support, the price of entry levels hybrid or fully electric sedans is expected to be steep in the initial years. During this period, it is probable that potential consumers switch to low cost, emission compliant hatchbacks. If this were to materialize, the next decade may witness the sale of hatchbacks in Europe growing at a much faster clip than ever before.

Impact on Indian passenger car industry

While global car manufacturers can brace themselves for downsizing in Europe, the corresponding scenario in India can be expected to remain stable even if the latter adopts similar norms on CO₂ emission from passenger cars.

This is because unlike Europe, the Indian passenger car market is heavily skewed in favour of hatchbacks (A1+A2) as depicted in **Chart-2**. Powered by petrol engines ranging from 0.6 liter to 1.3 liter (1.2 liter to 1.5 liter for diesel) hatchbacks occupy ~77% of the Indian market. Over the last 4 years, this share of hatchbacks has remained rock steady. This is despite rapid economic growth and rising income levels demonstrating extreme price consciousness of the Indian car buyer.

Such buying preference can have several ramifications. Its new car sales comprising largely of hatchbacks can easily be made compliant to emission



norms by adopting proven and readily available next generation ICE technologies.

However, it will also mean that the smaller segment comprising of mid-size, executive and premium cars (A3+A4+A5+A6) will have to adopt hybrid or electric propulsion systems. High cost lithium ion batteries will force manufacturers to price them beyond the affordable range for most Indians. What happened to the Civic hybrid in India can serve as a case in point. This may further increase the share of hatches (A1+A2) beyond current levels.

India based car manufacturers can experience a boost in exports as and when the demand for fuel efficient cars in Europe surges. This was witnessed during the recently concluded government subsidized replacement programs in Europe. Coupled with a robust domestic demand, this surge in exports can catapult India to become a global hub for manufacturing of hatchback cars. Slew of recent announcements by global auto majors to manufacture small cars in India are an acknowledgement of such an eventuality. This trend will be further accentuated by the advent of Nano and competing offerings from players like Hyundai, Fiat, Nissan, Suzuki etc. All of them are likely to set new benchmarks in fuel efficiency and emission levels to comply with 2020 norms.

Does this mean that India will miss the hybrid/ electric wave? Well, the answer lies in the pace of change in domestic consumer preferences. A rapid increase in per capita income beyond a certain

threshold level in the next decade may drive demand for big cars. However, mass acceptance of alternate propulsion will happen only when reliable Li-ion batteries are available at a reasonable cost. India could then potentially leapfrog into electric vehicles using the latest but cost effective battery technology.

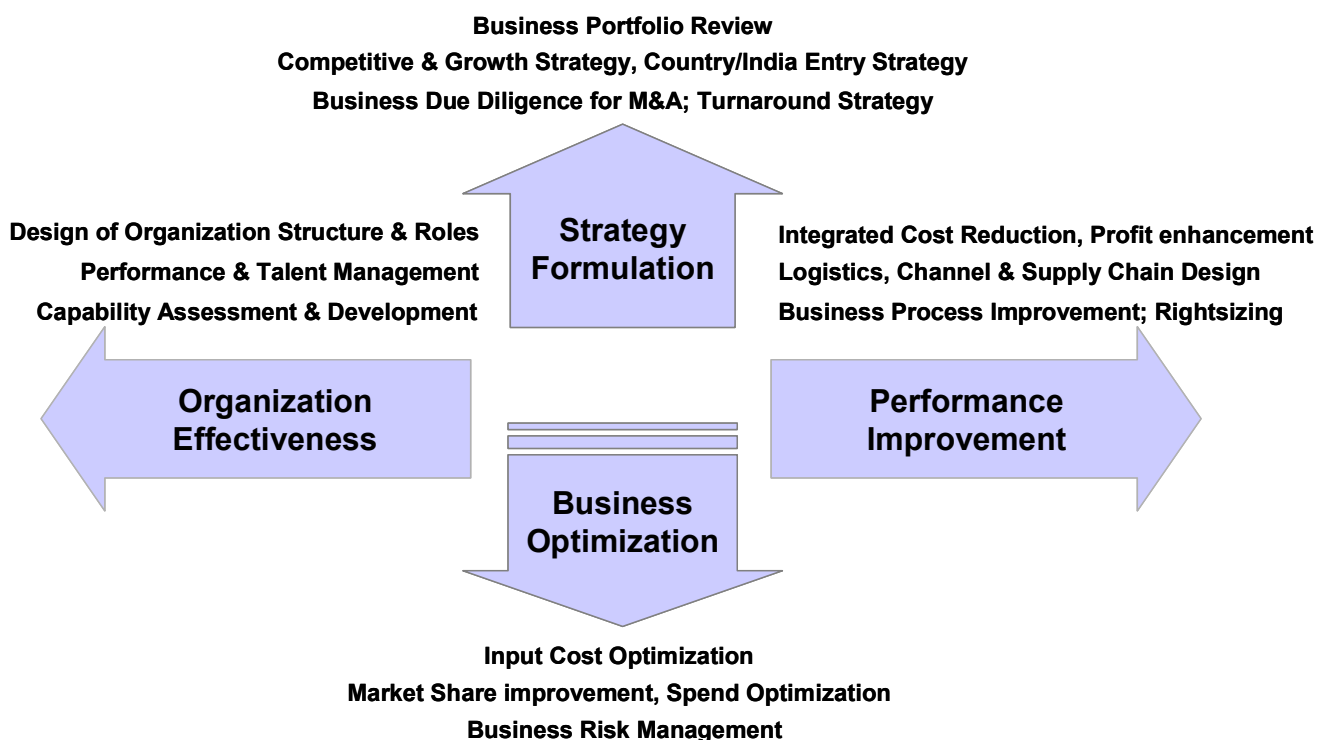
Till then, next generation ICE will be the predominant propulsion technology for vast majority of cars made in India....well beyond 2020.

Emerging Opportunities across the Value Chain

The next generation ICE technology will however create major challenges/ opportunities for suppliers in India. New aggregates, equipments and services arising from modifications in propulsion technology, materials, fuels etc. will be required. As India emerges as a global hub for low cost, fuel efficient cars, suppliers should gear up to ensure reliability in a cost effective manner. In many cases, innovative solutions and radical rethink on designs may be needed. Those who respond quickly and create an early mover advantage will reap the benefits from this global transition over the next decade and beyond.

© Tata Strategic Management Group. All rights reserved

Tata Strategic Management Group is a leading management consulting firm in South Asia. Set up in 1991, Tata Strategic has completed over 500 engagements with more than 100 Clients across countries and industry sectors, addressing the business concerns of the top management. We enhance client value by providing creative strategy advice, developing innovative solutions and partnering effective implementation.



TATA STRATEGIC MANAGEMENT GROUP

Nirmal, 18th Floor, Nariman Point, Mumbai 400021, India
Tel 91-22-66376710 Fax 91-22-66376600
Url: www.tsmg.com email: arindam.chakrabarti@tsmg.com