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HYBRID CONVERSION KIT NEED TO BE PROMOTED ALONG WITH PURE ELECTRIC VEHICLES IN INDIA

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Abstract: At present India is said to be third largest economy in the world in terms of PPP (PURCHASING POWER PARITY). To sustain economic growth and development, we need to give priority to reduce and replace dependence on fossil fuel. This can be done through promoting green technologies, hydrogen fuel cells, electric vehicles and promoting hybrid conversion kit of two, three and four wheelers. At present the government has provided incentives for electric vehicles but neglected incentives to hybrid conversion kits.

Key Words: GVA -Gross Value Addition, GDP – Gross Domestic Product, WEL – World Economic League, NSSO – National Sample Survey Organization, CAGR – Compound Annual Growth Rate, LMV – Light Motor Vehicles, GST – Goods & Service Tax, ICE - Internal Combustion Engines. FAME - Faster Adoption & Manufacturing of Hybrid and Electric Vehicles, EV – Electric Vehicle.

INTRODUCTION

INDIA AS AN EMERGING GLOBAL POWER

India is the sixth largest economy in the world, with a GDP of \$2.66 trillion in 2020. As India's economy picks up, even the World Economic League (WEL) estimates that India will overtake all European powers to become the third-largest economy in 2031. As per the rankings released by WEL, the world's GDP is set to hit \$100 trillion in 2022^[1]. The long-term growth perspective of the Indian economy remains positive due to its young population and corresponding low dependency ratio, healthy savings, and investment rates, increasing globalization in India and integration into the global economy. It is also the world's second-largest coal producer, the second-largest cement producer, the second-largest steel producer, and the third-largest electricity producer^[2]. According to several studies, India's growth rate should stabilize at 8% during the next decades, ranking the country as the world's fastest-growing economy. Its GDP could overtake that of the US before 2050, turning India into the strongest economy worldwide.

CRUDE OIL IMPORTS BILL OF INDIA

India, the world's third biggest oil consuming and importing nation, spent USD 119.2 billion in 2021-22 (April 2021 to March 2022)^[i], up from USD 62.2 billion in the previous fiscal year, according to data from the oil ministry's Petroleum Planning & Analysis Cell (PPAC). Oil prices started to surge from January and rates crossed USD 100 per barrel in the following month before touching USD 140 per barrel in early March. Prices have since receded and are now around USD 106 per barrel. According to PPAC, India imported 212.2 million tons of crude oil in 2021-22, up from 196.5 million tons in the previous year. This was; however, lower than pre-pandemic imports of 227 million tons in 2019-20. The spending on oil imports in 2019-20 was USD 101.4 billion. The nation produced 32.2 million tons of crude oil in 2019-20, which fell to 30.5 million tons in the following year and to 29.7 million tons in FY22, the PPAC data showed. According to PPAC, India's oil import dependence was 85 per cent in 2019-20, which declined marginally to 84.4 per cent in the following year before climbing to 85.5 per cent in 2021-22. PPAC data showed. India's import bill for liquefied natural gas (LNG) also increased to \$9.9 billion during the 10-month period of the current fiscal, significantly higher than \$6.2 billion worth of imports during the same period in the previous fiscal year, the PPAC data showed. The average price of the Indian basket of crude oil is about \$73 per barrel this fiscal year 2021-22 as against \$45 in 2020-21 and \$60.5 in 2019-20^[iii].

	Import (Million US\$)	
	Jan 2022	Jan 2021
Petroleum, Crude & products	11431.59 (21.98 % of total imports)	9424.30 (22.42% of total imports)
Total Imports	52005.91	42030.07

Source: [https://commerce.gov.in/press-releases/indias-merchandise-trade-preliminary-data-january-2022/#:~:text=DEPARTMENT%20OF%20COMMERCE,-%2BA%20A%20%2DA&text=India's%20merchandise %20import %20in%202021,20%20\(April%2DJanuary\),retrieved on 15-05-2022 at 4.52 pm](https://commerce.gov.in/press-releases/indias-merchandise-trade-preliminary-data-january-2022/#:~:text=DEPARTMENT%20OF%20COMMERCE,-%2BA%20A%20%2DA&text=India's%20merchandise%20import%20in%202021,20%20(April%2DJanuary),retrieved%20on%2015-05-2022%20at%204.52%20pm)



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Table 2: Trade during April-February 2021-22*

		April-February 2021-22 (USD Billion)	April-February 2020-21 (USD Billion)	April-February 2019-20 (USD Billion)
Overall Trade (Merchandise+ Services) *	Exports	601.77	441.84	487.50
	Imports	683.01	450.80	561.42
	Trade Balance	-81.24	-8.95	-73.92

* Note: The latest data for services sector released by RBI (Reserve Bank of India) is for January 2022. The data for February 2022 is estimation, which will be revised based on RBI's subsequent release. (ii) Data for 2019, 2020 and April to September 2021 are revised on pro-rata basis using quarterly balance of payments data.

The transport sector accounts for 18% of total energy consumption in India^[iii]. This translates to an estimated 94 million tons of oil equivalent (MTOE) energy. If India were to follow the current trends of energy consumption, it would require an estimated 200 MTOE of energy supply annually, by the year 2030 to meet the demand of this sector. Now, this demand is being met mostly through imported crude oil, which therefore makes this sector vulnerable to volatile international crude oil prices. Moreover, the sector also contributes an estimated 142 million tons of CO2 emissions annually, out of which 123 million tons is contributed by the road transport segment alone. Keeping in view the climate change commitments made by Government of India during the COP21 Summit held at Paris to reduce emission intensity by 33- 35% by 2030 from 2005 levels, it is pertinent to introduce alternative means in the transport sector which can be coupled with India's rapid economic growth, rising urbanization, travel demand and country's energy security. Electric mobility presents a viable alternative in addressing these challenges, when packaged with innovative pricing solutions, appropriate technology, and support infrastructure and thus, has been on the radar of Government of India. Data shows that we need almost 250 million tons of crude oil at present and 85 % of total need we must import by spending around USD 120 billion, which is almost 17 % of total import bill of USD 683 billion in 2021-22. Day by day our crude oil demand will increase, which will increase the import bill. Most of the Crude oil is used for vehicles to run, which is also resulting to increasing air pollution in major cities of India. The purpose of GOI (Government of India) to promote Electric Vehicles is to reduce dependency on imported crude oil apart from reducing air pollution in major Indian cities. Target of replacing all combustion engines to electric one by 2030 is seems to be difficult and unrealistic one. Such a situation we can promote hybrid conversion kit for vehicles. This will reduce consumption of fuel by 30 % immediately and hence the import bill on fuel can be reduced. Like electric vehicles, the government needs to provide incentives such as 5 % GST on hybrid kit and battery pack.

NUMBER OF COMBUSTION ENGINE VEHICLES IN INDIA:

Road transport plays a vital role in the economic development of a nation and is the prime mode of transport in India. It facilitates the movement of goods and passengers and promotes balanced socio-economic development across various regions of the country^[iv]. The transport sector accounted for 4.85 percent of the country's GVA (Gross value addition) in 2016-17 with road transport accounting for 3.12 per cent of the GVA, Railways accounting for 0.77 percent and Air Transport accounting for 0.16 percent. Road Transport is also a significant employer. The production of Motor Vehicles and parts component of Road Transport accounts for employment of 1.3 million i.e., 8.7% of the Industrial Employment as per NSSO in 2016-17 and is ranked third in terms of employment offered, after Textiles and Apparel (18.1%) and Food processing (11.4%). The total number of registered motor vehicles (Transport and Non-Transport) increased to **253 million in 2017**; recording a CAGR of 10.1 %, outpacing the CAGR of national highways of 5.54% in the last 10 years. The number of registered "Transport" vehicles, both goods and passengers, as on 31st March 2017 were 22.539 million accounting for 8.9 per cent of total registered vehicles with Non-Transport Vehicles accounting for the balance 91.1 %. Amongst the Transport Vehicles, LMV (Goods) account for a share of 30.6%, LMV (Passengers) account for a share of 25.1%, Trucks account for a share of about 19.3%, Taxis account for a share of 12% & Buses account for a share of 5.9%. Amongst the Non transport Vehicles, **Two Wheelers account for about 81%** and Car's account for about 12.43%. **Two-wheelers, which account for the largest segment of both registered vehicles (Transport and Non-Transport) of 73.86% as well as of non-Transport of 81% in 2017** have grown at the fastest rate with a CAGR of 10.47% in the last 10 years followed by Cars which have grown @ 10.29%. Out of the total 253 million registered motor vehicles up to 31st March, 2017 in India, the State of Maharashtra accounted for the largest share (11.93%) followed by Uttar Pradesh (10.37%), Tamil Nadu (10.31%), Gujarat (8.70%) and Karnataka (7.06%). These five States together accounted for 48.37 per cent of the total vehicles registered in the country. **Delhi (102.6 lakh) recorded the highest number of registered motor vehicles**, followed by Bengaluru (68.33 lakh), Chennai (52.99 lakh), Ahmedabad (39.04 lakh), Greater Mumbai (30.53 lakh) and Surat (28.87 lakh). **These six cities accounted for 44.27 per cent of the total registered vehicles in respect of the reported million-plus**



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cities. Surat reported the fastest growth in Registered Motor Vehicles in the last 10 years. The GST Rate for Passenger Vehicles (Petrol, Diesel, CNG, Hybrid) / Commercial Vehicles / Three Wheelers / Two-wheelers is at 28%. Over and above the GST, a State Compensation Cess is also levied on automobiles. **GST Rate for Electric Vehicles was brought down from 12% to 5% in the Budget for 2019.** Production of motor vehicles increased from 10.85 million units in 2007- 08 to 29.09 million units in 2017-18 with a CAGR of 10.36%. The category-wise analysis of production for the same period reveals that production of scooters grew the most with a CAGR of 20.81% followed by Utility Vehicles (16.08%). Production of Motor vehicles in 2016-17 of 25.3 million was around 10% of the total registered vehicles of 253 million. Exports of Motor Vehicles have increased from 1.2 million in quantity terms in 2007-08 to 4.0 million in 2017-18 registering a CAGR of 12.56 %. The total number of registered motor vehicles increased from about 0.3 million in March, 1951 to 253 million as on 31st March, 2017. **The share of two wheelers in total registered motor vehicles in India stood at 73.86% in 2017** as compared to 8.8% in 1951. Hence, we need to first focus on manufacturing of electric two wheelers; just two wheelers are almost 80 % of total vehicles in India. People will not phase out their old combustion engine two wheelers, hence two-wheeler electric conversion kit, hybrid conversion kit need to be promoted with lower 5 % GST rate on kit and battery pack. Data from the VAHAN dashboard^[v] reveals that there has been a considerable increase in the number of electric vehicles registered in India since 2012. Less than 6,000 electric vehicles registered in 2012. However, in 2015, the number of electric vehicles registered crossed 9,000 following the launch of the first phase of the FAME scheme. In the following year 2016, electric vehicle registration increased by 5.7 times, crossing the 50,000 marks. Since then, the registration of electric vehicles witnessed a steady growth up to 2019. **In the four years between 2016 and 2019, the registration of electric vehicles tripled from 51,129 to more than 1.61 lakh vehicles.** In 2019, the overall vehicle registrations in the country were over 2 crores while in 2020, it was more than 1.63 crores. In each of these two years, the number of electric vehicle registrations was less than 1% of all the vehicle registrations in India. Two-wheeler and three-wheeler electric vehicles account for the lion's share of electric vehicles registered in the country. Since 2016, these two categories constituted at least 96% of the electric vehicles registered in India. **In 2019, both categories (2 & 3-wheeler) constituted almost 99% of all-electric vehicles registered^[vi].** As per Vahan portal^[vii] accessed on 15-05-2022 at 12.26 pm, we have 3,70,435 total electric vehicles out of 68,38,927 all kind of vehicles, i.e., **electric vehicles are almost 5.41% of total registered vehicles. In the two-wheeler category total electric two-wheelers are 1,59,908 out of overall two-wheelers of 4703901 i.e., 3.3 % electric two wheelers out of 47,03,901 total two wheelers. In all kinds of electric vehicles (3,70,435), electric two wheelers (1,59,908) are 43.16 %.**

NEED TO PHASE OUT COMBUSTION ENGINES IN INDIA

According to the World Health Organization (WHO)^[viii], **India has the world's worst air quality.** In 2020, even during the Covid crisis with national and state lockdowns, 36 cities out of 50 cities which had unhealthy levels of air quality were from India. The vehicular pollution arising from the increasing stock of private vehicles, especially internal combustion engines (ICE) has contributed significantly to deterioration of air quality in Indian cities. **The increase in ICE vehicles stock has led to India becoming the third-highest oil consuming and greenhouse gas (GHG) emitting country worldwide.** Additionally, **two-thirds of deaths in India can be attributed to emissions coming from ICE (diesel) vehicles.** To address these issues the central ministry announced a goal to transition from latest sales of ICE (Petrol & Diesel) vehicles to 100% plug-in electric vehicles (EV) by 2030. The government is also aiming to transform India into a global hub for electric vehicles manufacturing. In 2019, the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) II scheme was adopted. It is important to note that FAME II policy which is the umbrella policy for India has been designed considering demand side incentives, where 86% of the funding is set aside for consumer incentives for EV purchases and 10% is allocated to fund charging infrastructure. Prior to the FAME II scheme, in FAME 1, the government had supported adoption of 2,78,000 EVs in different forms with a total incentive of INR 343 crore. EVs are becoming a crucial point for India's environment, energy and industrial policy combined. Research studies suggest that the short driving range of EVs is a significant barrier to faster adoption. Additionally, long battery recharge time and lack of charging infrastructure affects the demand. Also, the cost of EV being higher is another issue for adoption. Lack of local supply chains for parts and components used for manufacturing EVs and EV batteries creates barriers for local manufacturing. Batteries **can account for almost 40% of EVs' cost.** Automakers also needed clarification on potential issues related to battery standards, safety, warranties, and integration. Currently India imposes 100% import duty on fully imported cars with CIF (Cost, Insurance and Freight), and it does not treat EV separately from ICEs (Internal Combustion Engines). Additionally scrappage policy for ICE vehicles needs to be integrated with EV policies to encourage people to scrap their old ICE vehicles and create incentives for them to buy EVs instead.

NEED TO PROMOTE HYBRID CONVERSION KIT

The global hybrid electric vehicle conversion kit market size is poised to grow by 27.70 thousand units during 2020-2024, progressing at a CAGR of almost 13% throughout the forecast period, according to the latest report by Technavio^[ix]. The major hybrid electric vehicle conversion kit market growth came from the commercial vehicles segment. The enforcement of regulations to reduce emissions from commercial vehicles (CVs) is driving the adoption of hybrid drive trains. The high initial cost of a new hybrid commercial vehicle is benefiting the conversion kit market, as conversion kits are cost-effective to convert conventional CVs into hybrid



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commercial vehicles. The poor charging infrastructure in emerging countries such as India has led the authorities to push the adoption of hybrid technology and conversion kits. Market growth in this segment will be faster than the growth of the market in the passenger car segment. North America was the largest hybrid electric vehicle conversion kit market in 2019, and the region will offer several growth opportunities to market vendors during the forecast period. The global hybrid electric vehicle conversion kit market is fragmented. A123 Systems LLC, ALTe Technologies, Alti green Propulsion Labs Pvt. Ltd., Engineer, EV Drive, Hybrid Design Services Inc., IX Energy Pvt. Ltd., KPIT Technologies Ltd., Odyne Systems LLC, and XL Hybrids Inc. are some of the major market participants.

Mumbai-based EV conversion company GoGoA1^[x] had announced that it has witnessed a 60 percent surge in demand for the conversion kits since it first launched them. The company retails India's first RTO-approved electric conversion kit for motorcycles. The company opines that the law in India relating to retrofitting is very stringent which allows only authorized state agency to install the retrofit kits. More companies like RTO-approved GoGoA1, should be added to the retrofitting market besides the authorized players.

FAME (Faster Adoption and Manufacturing of Electric Vehicles) I & II Incentives

In the union budget 2019, the government^[xi] has announced an incentive for the purchase of an electric vehicle. In the budget speech, the finance minister has stated that advanced batteries and registered e-vehicles will be incentivized under the scheme. A new **section 80EEB** has been introduced allowing a deduction for interest paid on loan taken for the purchase of electric vehicles from the AY 2020-21. The deduction under this section is available only to individuals. This deduction is not available to any other taxpayer. Thus, if you are a HUF (Hindu Undivided Family), AOP, Partnership firm, a company, or any other kind of taxpayer, you cannot claim any benefit under this section. A deduction for interest payments up to Rs 1,50,000 is available under Section 80EEB. An individual taxpayer may have an electric vehicle for personal use or for business use. This deduction would facilitate individuals having an electric vehicle for personal use to claim the interest paid on the vehicle loan. In the case of business use, an individual can also claim a deduction up to Rs 150,000 under section 80EEB. Any interest payments above Rs 150,000 can be claimed as a business expense. To claim as a business expense, it is necessary that the vehicle should be registered in the name of the owner or the business enterprise.

The union cabinet has approved Phase-II of FAME scheme for promotion of electric mobility in the country. Phase-II of the scheme started from 1 April 2019 and will be completed by 31 March 2023. The Phase-II is an expanded version of the first phase. FAME India Phase II has a total outlay of Rs 10,000 Crores over a period of 3 years from 1 April 2019 to 31 March 2023. As per the budget document, the subsidy under the Faster Adoption and Manufacturing of Hybrid & Electric Vehicles (FAME) for fiscal 2023 is projected at Rs 2,908 crore, or more than three-and-a-half times the allocation of Rs 800 crore for this fiscal year. The industry body said after multiple requests to the government, the FAME-II scheme was amended to offer higher subsidies. The government has increased the incentive for electric two-wheelers to Rs 15,000 per kwh from Rs 10,000. Also, the cap on incentive has been increased to 40% of the vehicle cost from 20%. The budget document of FY23 shows the union government's total spending under the FAME policy to be Rs 4,671 crore between FY19 and FY23. The total outlay for the Rs 10,000-crore FAME-II scheme is divided into Rs 8,596 crore for demand incentive, Rs 1,000 crore for charging infrastructure and balance for administrative infrastructure and committed expenditure in FAME-I. On electric automobiles and SUVs, Maharashtra^[xii] offers a maximum subsidy of Rs 2.5 lakh, while Delhi, Gujarat, Assam, Bihar, and West Bengal offer maximum subsidies of Rs 1.5 lakh. Subsidies ranging from Rs 5,000 to 30,000 are available in Delhi, Maharashtra, Meghalaya, Gujarat, Assam, Bihar, West Bengal, Rajasthan, and Odisha for the purchase of electric two-wheelers.

BATTERY – SWAPPING SCHEME:

NITI Aayog^[xiii] proposed a draft of incentives to encourage the creation of battery-swapping infrastructure for electric vehicles (EVs), including offering subsidies to developers and reducing the goods and services tax (GST) on batteries to 5%. "Battery providers shall receive the subsidy, provided the battery swapping ecosystem that they represent satisfies the technical and operational requirements. The scheme will clarify the modality of the subsidies in a way that balances benefits to recipients with the ease of implementation," it suggested. The draft policy also suggested that the GST Council should consider reducing the GST on lithium-ion batteries to 5%. According to the current GST regime, the tax rates on lithium-ion batteries and EV supply equipment are 18% and 5%, respectively. Abhijeet Sinha, project head at National Highways for EV, said the battery-swapping policy is expected to make mass production and deployment of lithium-ion batteries possible. "The policy will encourage the shift of a large user base to EVs from internal combustion engines as it will cut electric two-wheeler and three-wheeler prices by 30–40% with battery on subscription services," Sinha said. The draft policy noted that battery-swapping involves users purchasing an EV without the battery, significantly lowering upfront costs, and paying a regular subscription fee to service providers for battery services throughout the vehicle's life. It is used by 2- and 3-wheelers, which have smaller batteries that are easier to swap than other automotive segments. Amit Kumar^[xiv], partner and leader for power, utilities, and mining at PwC India, said one of the prime objectives of the policy is to reduce the cost of ownership



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of EVs. The paper says other incentives to boost battery swapping and prioritize metropolitan cities with a population above 40 lakhs for setting up a network. The Niti Aayog in its draft policy said all major cities such as state capitals, UT headquarters and cities with population above 5 lakhs will be covered under the second phase, given the importance of the two-wheeler and three-wheeler vehicle segments in growing cities. The GST tax rate for the factory fitted battery is 12 per cent. The rate for the spare ones was 28 per cent, which has now been reduced to 18 per cent. This drastic drop is appreciated, but it is still higher than the factory fitted ones. This is one of the main reasons for the EVs to be priced so high in India. A lithium-ion battery must be purchased once every 4-5 years, which would prove costly for the buyers.

SUGGESTIONS

1. Target year of 2030 for phasing out ICE vehicles are difficult, hence apart from Electric Vehicles (EVs), we need to promote hybrid, CNG, Hydrogen fuel cell, Bio Fuel vehicles.
2. More than 253 million ICE vehicles cannot be replaced by 2030 with EV, s, hence hybrid vehicle conversion kit should be promoted with lower GST rate, subsidies etc.
3. Hybrid and pure electric conversion centers should be promoted with subsidies.
4. Existing ICE vehicle mechanics need to be provided with skill training at subsidized rate under skill upgrade schemes.
5. A lower GST rate of 5 % should be introduced on electric vehicle battery packs and electric hybrid conversion kits.
6. RTO approval and ARAI certification should happen for hybrid and electric conversion kit and approved centers.
7. On urgent basis all metro cities should implement policy of EVs, hybrid vehicles and should have authorized conversion centers.
8. Government should purchase only electric or hybrid vehicles.
9. ICE vehicle scrapping policy should have incentives to buy electric vehicles or incentives to convert electric or make it hybrid vehicle. Renewal of old vehicles should happen only if it is converted to electric or hybrid mode from authorized conversion center.
10. All ICE vehicles should have 40 % GST and it should go on step by step to discourage people from buying ICE engines.
11. All public transport vehicles like city buses, taxis, and autos should be electric mode and existing such ICE vehicles should be converted to electric mode.
12. Battery swapping for 2 – 3 wheelers should be promoted and there should be standard size batteries for autos.
13. Affordable battery technology needs to be developed within the country with recycling of batteries and handling of hazardous waste.

CONCLUSION: Road map for phasing out of ICE vehicles by 2030 should be ready. Apart from electric vehicles, CNG, Bio fuel and hydrogen cell vehicles should be allowed and promoted. Existing ICE vehicles need to be converted into hybrid and electric mode. For this hybrid and electric conversion kit incentives need to be given incentives, lower GST of 5%. Battery swapping stations and standard batteries should be promoted. Initially all polluting metro cities should have a green vehicle policy like all public transport vehicles should be electric, new two wheelers should be electric, existing vehicles should be converted into electric or hybrid.

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