CII-ITC Centre of Excellence
for Sustainable Development

Confederation of Indian Industry

Sectoral Report

TRANSPORT SYSTEMS

Roadmap for Achieving Net Zero Transition in India by 2070

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This report draws insights and data from McKinsey's "Decarbonising India: Charting a pathway for sustainable growth." The recommendations contained in this report are of the CII Net Zero Council.

Context Setting: The CII Net Zero Council's sectoral report on Transport Systems explores strategies for India to achieve net-zero emissions in the transportation sector. It evaluates emission reduction levers within two scenarios: a Line-of-sight/Business-as- usual scenario based on current policies and technology trends, and an Accelerated scenario incorporating advanced policies and technology adoption. The report highlights the transport sector's significant carbon footprint, the challenges and costs associated with transitioning to net-zero emissions, and the interdependencies, co-benefits, and trade-offs of decarbonisation. It proposes policy recommendations, financing solutions, and actions for businesses, highlighting the importance of electrification, renewable energy, and innovative technologies in achieving net-zero goals by 2070.

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Foreword

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Global CEO and Managing Director
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> ***This sectoral report on "Transport Systems" sets forth a comprehensive roadmap for the decarbonisation of India's transport systems, starting with the accelerated adoption of Electric Vehicles.***

In an era where the clarion call for climate action resonates stronger than ever, India's journey towards net-zero emissions is both a monumental challenge and a historic opportunity. Standing at the cusp of transformative change, the CII Net Zero Council is committed to leading from the front to achieve this ambitious goal.

Transitioning to a net-zero emissions future in India presents a complex challenge, given the significant carbon footprint of the country's transportation sector across various modes - including road, rail, air, and water - encompassing both passenger and freight transport. We recognize that achieving net-zero emissions in the transport sector is an environmental imperative as well as an economic opportunity that can drive innovation, create jobs, and enhance India's global competitiveness.

This sectoral report on "Transport Systems" sets forth a comprehensive roadmap for the decarbonisation of India's transport systems, starting with the accelerated adoption of Electric Vehincles (EVs). EVs are central to our efforts, and the report outlines the key levers that can accelerate this transition.

At the heart of this transition is the imperative to localize battery production on a massive scale. This report emphasizes the need to establish battery giga-factories that can achieve competitive cost curves. Additionally, the report encourages investments in emerging battery technologies such as solid-state and sodium-ion, underlining the importance of staying at the forefront of innovation.

Lowering the cost of hydrogen fuel cells, type IV carbon fiber tanks, refueling and distribution are other critical aspects, especially for Large commercial vehicle emission reduction through hydrogen ICE vehicles and Fuel Cell Electric Vehicle (FCEV) technologies. Continued fiscal support remains indispensable to the transition and the report calls for the continuation of fiscal incentives such as fossil fuel taxes, GST benefits, and the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) subsidy until at least 2030. Similar incentives and subsidy structures are required for transitioning from carbon based to hydrogen economy in mobility sector. Investments in charging infrastructure are integral in ensuring the success of the EV ecosystem. A robust charging network is a linchpin for the widespread adoption of EVs. Investment in refueling and distribution are critical and integral for success of hydrogen ecosystem.

In addition to EVs, the report recognizes the importance of initiatives that accelerate the transition of road freight towards electrified rail freight, exemplified by Dedicated Freight Corridors (DFCs). Fast tracking the achievement of the target rail share of 45 percent by 2040 can significantly contribute to reducing emissions from the transportation sector.

Furthermore, the report acknowledges the challenges posed by hard-to-abate segments, especially Heavy Commercial Vehicles (HCVs). It calls for targeted affirmative actions to drive the adoption of cleaner technologies in these segments, acknowledging that their transition may require specialized efforts.

The report highlights the need for a collaborative policy framework that incentivizes low-carbon transport solutions, streamlines regulatory processes, and fosters innovation in sustainable transport technologies. It points to the success stories of countries that have accelerated their transition through policy support, suggesting a tailored approach for India that considers its unique socio-economic and geographical context.

Digital technologies have also emerged as key enablers in the transport system transition. With the potential to optimize route planning, enhance the efficiency of public transport systems, and encourage the adoption of shared mobility solutions, digital innovations stand to significantly reduce the carbon footprint of India's transportation sector.

As the Chair of the CII Net Zero Council, I am privileged to witness and contribute to this collective endeavour. Our actions today will determine the legacy we leave for future generations. Let this report serve not just as a testament to our commitment but as a blueprint for the transformative actions we must undertake.

Together, we have the power to achieve India's net-zero ambitions and lead the global charge in climate action. A strategic and collaborative approach, uniting policymakers, industry stakeholders, and the financial community to address the multifaceted challenges of this transition is needed. By fostering innovation, enhancing local manufacturing, and developing skills, and by leveraging global partnerships for technology transfer and joint R&D initiatives, we can drive India—and indeed the world—towards a sustainable, clean energy future.

1. BACKGROUND

The report discusses emission reduction levers across two scenarios, both of which assume an orderly transition (a) the Line of Sight (LoS)/Business as usual (BAU) scenario with current (and announced) policies and foreseeable technology adoption and (b) the Accelerated scenario with further reaching polices like carbon prices and accelerated technology adoption, including those of technologies such as Carbon Capture, Utilization, and Storage (CCUS).

In the LoS scenario, India could achieve net zero emissions by 2070, while in accelerated scenario, India could be net zero by 2050.

Getting to the LoS scenario would create 207 $GtCO_2e$ of carbon space till 2070, while the Accelerated scenario would add a further 80 $GtCO_2e$. (Exhibit 1) It is equivalent to 36 percent and 14 percent, respectively, of the remaining carbon budget for an even chance at limiting warming to 1.5 degrees Celsius.

However, in either of the scenarios, India will not be able to achieve net zero, due to the residual emissions from agriculture and select industrial sectors (remaining emissions in 2070 of 1.9 and 0.4 $GtCO_2e$ in the LoS and Accelerated scenarios, respectively).

> ***In our LoS scenario India could get to net-zero emissions by 2070, while in accelerated scenario, India could get to net zero by 2050.***

India's GHG emissions, Gt CO_2e per annum[1]

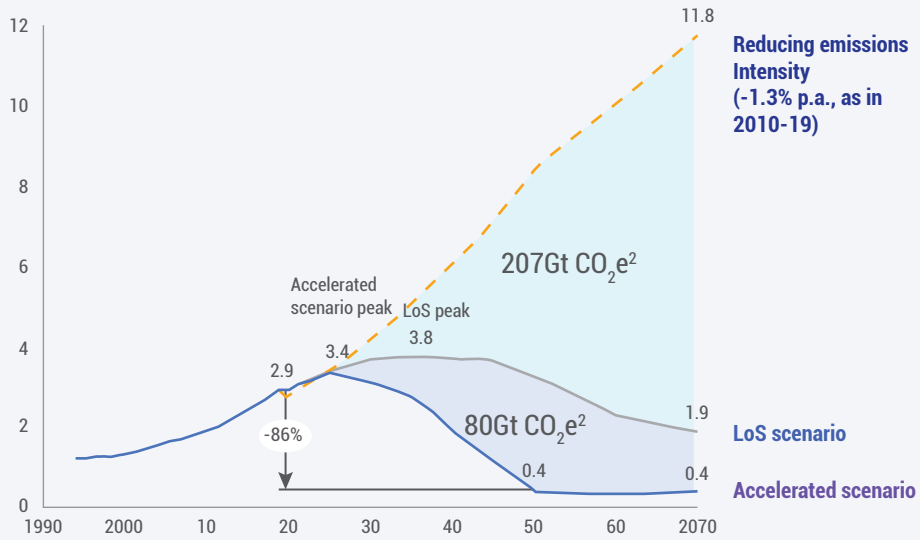

Exhibit 1

1.1 Contribution to India's emissions

India's transport sector leave behind carbon footprint across multiple modes – road, rail, air, water and includes both passenger and goods transport. Automotive tailpipe emissions account for 280 MtCO2e per annum (7-8 percent of India's total GHG emissions), increasing at about 6-8 percent per annum, due to a growing vehicle, increasing size of vehicle engines and increasing average usage per vehicle.

Tailpipe emissions (scope 3) are far higher than upstream materials used in the car (scope 3), fuel value chain (scope 2) and vehicle manufacturing (scope 1) emissions. Surface transport is responsible for the bulk of the tail pipe emissions (over 70–75 percent). Of the total contributions of surface transport, large portion of it comes from the commercial vehicles used for goods transportation (190 $MtCO_2e$ per year for FY21, comprising about 75 percent of total tailpipe emissions).

1.2 Current trends/ trajectories

The shifting demand for larger cars and, hence, engines (e.g., the share of entry-level hatchbacks has dropped from over 60 to 40 percent over the last 8-9 years) and the growing population (from 290 million today to over 700 million by 2050) will lead to emissions growth. In the internal combustion engine world, tailpipe emissions could rise to 800 $MtCO_2e$ annually by 2050.

The sector has been on the path of energy and carbon efficiency through measures like light-weighting (ten percent weight reduction improves mileage by six to eight percent), advanced combustion technologies and engine hybridisation. The government has also put in place regulations that reduce emissions by bringing in Corporate Average Fuel Economy (CAFE) norms that started with passenger cars and are extending to CVs and other categories. Yet, these interventions provide only marginal improvements.

The sector has also begun its electrification journey buoyed by declining battery costs (a key component in EV manufacturing) and favourable Government support in the form of PLI schemes for battery manufacturers and FAME subsidies for consumers, lower GST rates for EVs, etc.

1.3 Aspirations

India can achieve almost net-zero tail pipe emissions by 2070 in the business as usual (BAU) scenario where there is sustained demand, economic growth, and ongoing adoption of low-carbon technologies.

In the accelerated scenario which assumes the adoption of decarbonisation levers at a much faster pace, near net zero tail pipe emissions can be achieved by 2050, leading to an additional cumulative abatement of 7 billion tons of CO_2e by 2070. The accelerated scenario considers a concerted effort across demand, technology, and policy domains to adopt new low carbon such as blended fuels, Hydrogen technologies, cross-cutting themes, nascent technologies, and new policy interventions aimed at accelerating decarbonisation.

India's vision of green hydrogen in mobility sector should also be specifically mentioned.

2. ROADMAP TOWARDS NET ZERO EMISSIONS

2.1 Decarbonisation Financing Challenges

High upfront costs of EV ownership, financing the transition and devising ways to decarbonise hard-to-abate segments like medium and heavy commercial vehicles (MCVs/HCVs), are some of the barriers to faster decarbonisation of the automotive sector.

High upfront costs

Currently, the EV cost difference versus comparable ICE (Internal Combustion Engine) vehicles is substantial (as high as 1.9x) which is a big deterrent to EV adoption. Despite 2 and 3-wheelers achieving Total Cost of Ownership (TCO) parity, the high upfront costs and lack of financing options make EV ownership inaccessible to large segments of the Indian population, thus weakening demand. Uncertain demand in turn deters industry players from making bold investments in the sector.

Financing the transition

Decarbonisation of the automotive sector would require large-scale capex financing of somewhere between $1.9-3.2 trillion.
It would include not just setting up EV manufacturing facilities but financing the entire value chain from component suppliers to charging infrastructure, battery swapping technologies, etc. A lot of this investment would be recouped over the years due to lower opex but the novelty of the technology and uncertainty around its risks make financial institutions and investors wary of pouring large sums of money into the sector. Additionally, the EV sector is witnessing the emergence of new and innovative business models that require significant financing to thrive.

Decarbonising hard-to-abate segments

Medium and Heavy Commercial Vehicles (MCVs and HCVs) including inter-city buses will most likely take Hydrogen Internal Combustion Engine (H2ICE) and fuel cell way the fuel-cell way to achieve near zero emissions as batteries electrify as batteries typically create dead weight and reduce carrying capacity. For mass adoption of the Fuel Cell Electric Vehicles (FCEV) technology, the fuel cell cost would have to come down to $60–70 / kW and at-nozzle hydrogen cost to less than $3/kg by 2050, which is likely to happen only in the 2040s. Hence, the electrification of MCVs and HCVs is going to be slower than all other vehicle types with 100 percent new vehicle electrification likely only post-2055. H2ICE is a potential technology that solves the problem of high initial cost, payload and helps accelerate the emission reduction at TCO equivalent or better than the fossil fuel based medium and heavy duty vehicles.

> ***The EV cost difference versus comparable Internal Combustion Engine (ICE) vehicles is substantial (as high as 1.9x) which is a big deterrent to EV adoption.***

2.2 Possible emissions reduction trajectory

Two scenarios are considered to outline the emissions reduction trajectory as outlined earlier-a BAU scenario and an accelerated scenario. Since surface transport is a significant contributor of GHG and within it commercial vehicles contribute 75% within it, H2ICE technology will enable achieving GHG targets much earlier if considered in accelerated scenario. Since surface transport is a significant contributor of GHG and within it commercial vehicles contribute 75% within it, H2ICE technology will enable achieving GHG targets much earlier if considered in accelerated scenario.

Conversion of existing BS4 and beyond vehicles to H2ICE will further accelerate the emission reduction trajectory.

Conversion of existing BS4 and beyond vehicles to H2ICE will further accelerate the emission reduction trajectory

Business-as-usual scenario

In the BAU scenario, the automotive sector could get to net-zero tailpipe emissions by 2070 (Exhibit 2). Electrification of mobility is accelerating due to advances in battery technology (storage capacity per kg up two times, average cost reduction of 17 percent every year over the last ten years). The sector also benefits from Government support (GST benefit of five percent on EVs and hydrogen based/bio fuels vs 28-51 percent for fossil Fuel based ICE Vehicles) versus 28–51 percent on ICE vehicles; dedicated FAME and PLI schemes). Perhaps the most important factor is an implicit carbon tax on transportation fuels of $140–240/tCO$_2$e.

Based on these strong enabling forces, two- and three-wheeler sales are expected to be fully electric by 2040. Passenger cars, which require relatively larger battery sizes, could see an inflection point in electrification around 2030 when battery costs go below $100 /kWh, and the charging network develops at scale.

It will mean that the complete stock of vehicles would be 95 percent electric by 2070. Additionally, an increase in rail share of freight – from about 25 percent currently to 45 percent by 2050, driven by initiatives like the dedicated freight corridors – has the potential to reduce CV demand by half a million, leading to further abatement.
It leads to net-zero automotive tailpipe emissions by 2070 in our BAU scenario.

Emissions reduction trajectory through BAU Scenario

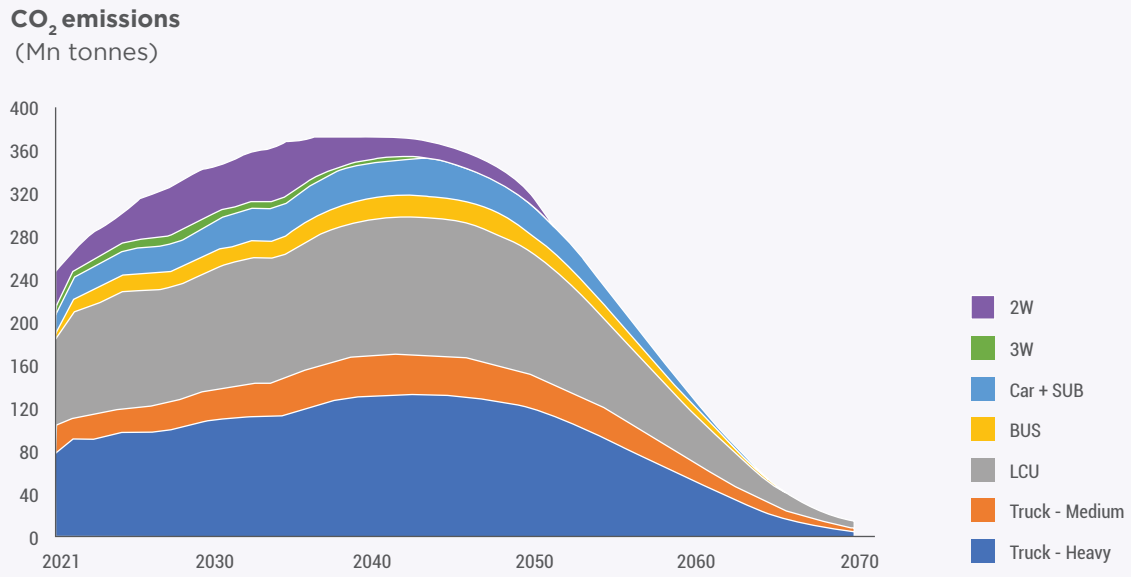

Exhibit 2

Accelerated scenario

If India accelerates interventions to address adoption challenges and drives reforms to encourage investments, along with targeted affirmative actions, near net-zero tail-pipe emissions may be possible by 2050.

In the Accelerated scenario, India can abate 95 percent of tail pipe emissions (Exhibit 3) by 2050. The acceleration would come from reducing battery and fuel cell costs more quickly through at-scale localisation; providing continued Government support through GST and FAME benefits till 2030; maintaining fossil fuel taxation at current levels; achieving the targeted modal mix of 45 percent for rail freight by 2040; and providing pointed affirmative action for transitioning to EVs for select 'late-transition' vehicle categories like HCVs.

The Accelerated scenario would result in an additional cumulative abatement of around ~7 GtCO2e till 2070 versus the BAU scenario.

In this scenario, EV penetration growth could be higher across all categories of vehicles and reach 100 percent EV sales by 2035 for two- and three-wheelers, by 2045 for cars and by 2050 for heavy commercial vehicles.

These new vehicle sales trajectories, along with useful life cycles of the existing and new ICE vehicles sold, would mean the complete stock of vehicles reaches 90 percent electrified by 2050, leading to near net-zero tailpipe emissions.

Emissions reduction trajectory through Accelerated scenario

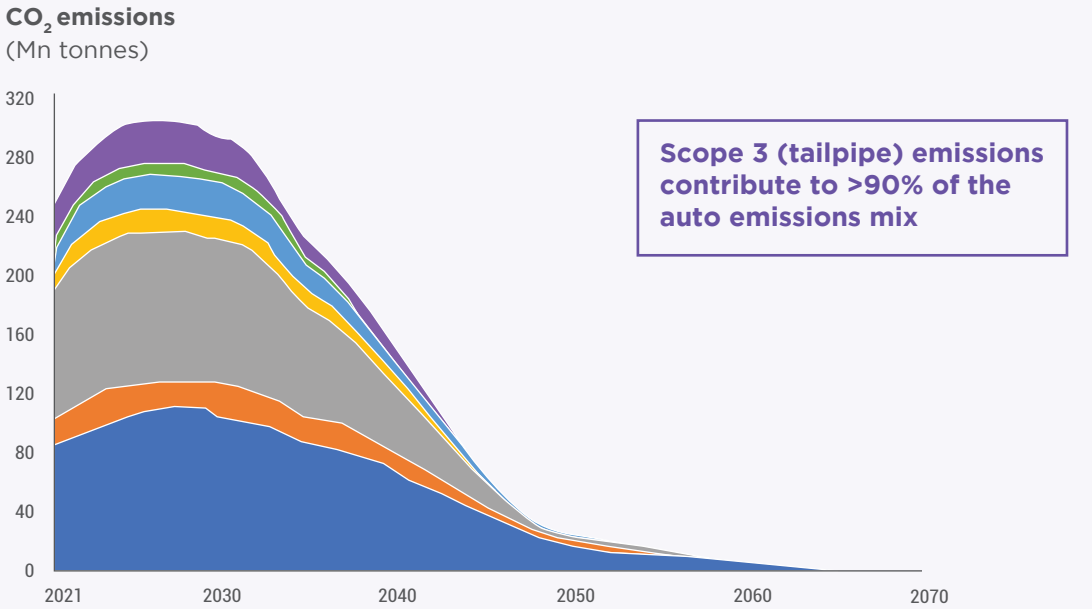

Exhibit 3

2.3 Key decarbonisation levers

The key abatement levers that can aid the rapid decarbonisation of the automotive sector include:

- **At scale and fast localisation of battery giga-factories,** with the best cost curves achieved around seven to ten years earlier, i.e., $70–75/kWh by 2030 and $55–60/ kWh by 2040; along with investment in new technologies like solid-state, sodium-ion.
- **Lower hydrogen fuel cell costs,** which are essential for large CV electrification through FCEV technology, as well as making sure that hydrogen is competitive and widely available. The trajectory would need to be accelerated by ten years – to get to $60–70/kW fuel-cell cost and at-nozzle hydrogen prices of less than $3/kg by 2035.
- **Continued stimulus,** in the form of fossil fuel taxes, GST benefits and the FAME subsidy until at least 2030; and through the extension of FAME subsidy to vehicle categories where it is not available. Additionally, scrappage benefits especially when the replacement vehicle is an EV, along with strict enforcement of vehicle age norms, can help a faster turnover of existing fleet into EVs.
- **Investments to support the build-out** of enabling charging infrastructure, through the Government's own investment, capex subsidy for first installers, etc.
- **Initiatives that accelerate the transition of road freight** toward electrified rail freight (e.g., DFCs) ccan be encouraged to get to the target rail share of 45 percent by 2040.
- **Targeted affirmative actions** on hard-to-abate segments like HCVs.
- **Large scale and quick localization** of type IV carbon fiber cylinders
- **Localization** of key equipments involved in hydrogen refueling and distribution network

3. COST OF TRANSITION TO NET-ZERO

3.1 Estimated costs to achieve net-zero emissions

The total incremental capex for this green transition is sizeable – $1.9 trillion till 2070 for the BAU scenario; and an extra $1.3 trillion till 2070 for the Accelerated scenario.

On the positive side, migration to EVs would have significant savings on Opex – with opex totalling $9.0 trillion till 2070 for the BAU scenario ($6.1 trillion without taxes), and additional opex savings of $3.7 trillion in the Accelerated scenario ($2.5 trillion without Government taxation).

Relative to the BAU scenario, the Accelerated scenario saves $1.2 trillion till 2050 and $2 trillion till 2070 in forex for oil (Exhibit 4). Netting off battery and battery material imports, which are higher in the Accelerated scenario, would still lead to substantial savings — $0.9 trillion till 2050, and $1.7 trillion in savings till 2070.

> ***On the positive side, migration to EVs would have significant savings on opex – with opex totalling $9.0 trillion till 2070***

India's GHG emissions (Gt CO2e per annum)

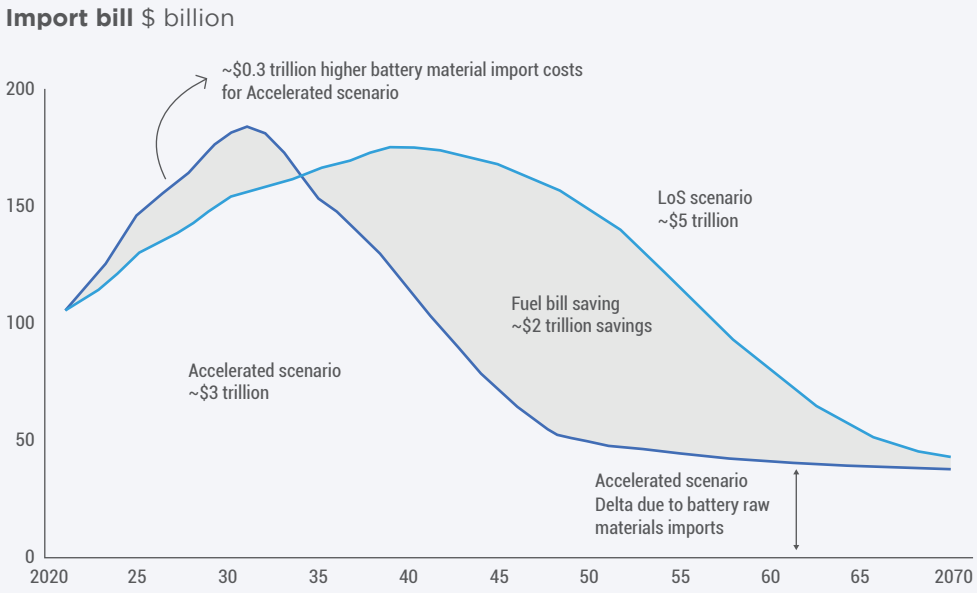

Exhibit 4

3.2 Potential financing solutions

Despite 75% of the transition being in the money, financing is constrained due to real and perceived risks (e.g., technology risks, payment risks, project execution, policy stability) and structural constraints (e.g., investor expectation mismatch, limited participation from the Indian banking sector).

- India needs an aligned, cross-sectoral, top-down strategy for decarbonisation of the automotive sector, implemented through relevant policies and schemes. Concerted efforts need to be made to facilitate and encourage businesses to set up EV manufacturing and build its operating ecosystem of charging, battery swapping, service stations etc. while also incentivising to customers to help bear the high upfront costs of ownership.
- Businesses could generate funds via Sustainability Linked Loans (SLLs), Green Bonds and Green Project Finance. They link interest rates to performance against sustainability criteria thus giving favourable interest rates to green businesses. With growing acceptability of ESG investing, these instruments are going to be more widely available and utilised.
- Consumer financing could be done via low-interest rate and high-LTV green vehicle loans. Banks and NBFCs could explore cross-sectoral partnerships with OEMs and other ecosystem players to help offset asset risk and develop a secondary market for EVs. Special emphasis needs to be laid on enabling EV financing for low-income consumers like auto drivers, etc. Lending to such sections could be enabled by a combination of approaches like digital lending, the use of analytics, non-traditional underwriting using telematics and psychometry, etc.
- Across both businesses and consumers, government incentives and subsidies such as battery manufacturing PLI, lower GST rates for EVs, FAME subsidies on EV purchases, etc. would continue to play a critical role in supporting the transition.

4. INTERDEPENDENCIES, CO-BENEFITS AND TRADE-OFFS

4.1 Sectoral net-zero trajectory dependencies

The decarbonisation of the EV sector is deeply intertwined with the decarbonisation of the power sector.

- **The electricity grid needs to decarbonise** so that EVs are charged with renewable power instead of power produced using fossil fuels. The lack of renewable electricity will undo the very reason for shifting from ICEVs to EVs. As much as 50-60% additional potential of Scope 2 emissions reduction from EVs lies in the use of green electricity.
- **Implementation of Extended Producer Responsibility (EPR)** is also a critical lever for lifecycle management of the automotive sector especially when focusing on reducing emissions from materials used in manufacturing the EVs; materials which continue to be expensive and subject to commodity market fluctuations. The implementation of EPR must be more objective and sustainable in nature. As per Battery Waste Management Rules (BWMR) 2022, collection targets for electric 3Ws are only 3 years, with 70% of batteries to be collected in 2024-25 for vehicles sold in 2021-22. which may not align with the intent of BMWR.

  The collection target should be revised to 6 years to be more inclusive for all categories of e-three-wheelers (L5 and e-Ricks) and the current batteries chemistries. Thus, material circularity is a key lever for automotive decarbonisation.

4.2 Potential decarbonisation co-benefits

Decarbonisation of the automotive sector has several co-benefits for multiple dimensions of India's socio-economic future:

- **Reduced import dependence for fuel and associated forex savings:** India imports oil worth about $100 billion currently. Accelerated transition would also save forex on crude import of $900 billion till 2050 (net of battery material import), versus the BAU scenario.
- **Lower obsolescence:** A faster transition to electrified mobility would mean less capex investment in older technology leading to lower obsolescence. Additionally, the EV manufacturing footprint is less capex intensive (about 50 percent lower), making India's manufacturing capital more productive.
- **Path for a global play:** The Indian automotive industry can reimagine its global play. An accelerated transition presents India with an opportunity to become a global manufacturing base for select categories, e.g., e-two-wheelers, e-three-wheelers, and e-SCVs.

The lack of renewable electricity will undo the very reason for shifting from ICEVs to EVs. As much as 50-60% additional potential of Scope 2 emissions reduction from EVs lies in the use of green electricity.

India is already exporting a large volume of two-wheelers (25 percent of production; 4 million units) and three-wheelers (over 60 percent of production, 0.5 million units) and can leverage this disruption to lead the change to EVs and take a leadership position in India-similar export markets (e.g., Africa, LatAm, SE Asia).

Significant upheaval in global trade led by changing geopolitics presents the perfect opportunity for Indian vehicle manufacturers to scale their global ambitions.

4.3 Potential decarbonisation trade-offs/co-costs

- The Indian Government would need to re-balance its finances as fuel taxes, which currently amount to 14 percent of the total tax receipts at $50 billion (two percent of GDP) will decline with faster EV penetration.
- It is also imperative that the transition be done in a just manner to ensure the continued employment and livelihoods of workers intertwined in the ICEVs ecosystem from component suppliers, factory workers, servicemen, etc. It is crucial to provide support to automotive sector MSMEs to navigate the EV transition.

5. POLICY RECOMMENDATIONS

Government subsidies, incentives and policies will play a key role in enabling the EV transition.

- **Implicit carbon taxes on transportation fuels** in the form of central and state VAT and excise duties need to be maintained and gradually increased to disincentivise consumers from purchasing Fossil Fuel based ICEVs. For example, these amount to 35–45 percent of the petrol retail price in Delhi and translate to an implicit carbon tax of $140–240/tCO$_2$e for the usage of petrol, depending on the crude oil price and prevailing rates of taxes.
- **Continued upfront fiscal support** in terms of lower GST rates (five percent for EVs and hydrogen based/bio fuels vs versus 28–51 percent for fossil Fuel based ICE vehicles) and FAME benefits (incentive on electric 3W should be revised to Rs. 15000/Kwh of battery). Experience gained from FAME-I / FAME-II clearly indicate that fiscal incentives play a very important part in a price sensitive market like India. Continuity of FAME scheme and the subsidies are a must to maintain the positive momentum of EV sales growth trajectory. The calculation of demand incentives based on battery capacity (measured in kWh) provides uniformity across all product categories, as cost of batteries is the one of the major factors in difference between Fossil Fuel based ICE vehicles and EVs.

  The current subsidy structure of FAME 2 is effectively addressing the price gap. Higher incentive of Rs 15,000/kWh or 40% of ex-showroom price drive will drive adoption by reducing the gap of cost of acquisition and fulfil the objective of lower acquisition cost, which is crucial to reduce the down payment and EMI burden on these marginal customers.

  The government must extend the FAME subsidies beyond the current expiry date of 2024 till 2030 and beyond, to make EV ownership affordable. It would also be helpful to extend FAME subsidies to new vehicle categories like passenger cars.
- **Greater Scheme outlay for charging infrastructure:** The current outlay of Rs.1,000 crore is inadequate and needs to be rapidly scaled up to accelerate the expansion of the EV ecosystem. A concerted policy push to establish standards for charging infrastructure, battery swapping etc. is also required.
- **Create a resilient indigenous manufacturing capability and increase investment in cleantech R&D:** Efforts would likely be needed to develop local raw material resources (e.g., rare earths), secure materials from elsewhere in the world and produce equipment (e.g., batteries) locally through mechanisms like the PLI.

  It could be supported by a green innovation mission in collaboration with the private sector, academia, start-ups, etc. to accelerate investments, at-scale adoption, and localisation of clean technologies such as low cost of green hydrogen, next-generation energy storage, etc.

The Government must extend the FAME subsidies beyond the current expiry date of 2024 till 2030 and beyond, to make EV ownership affordable.

- **Help generate finance for the transition:** In addition to providing direct incentives and tax benefits, the Government needs to help the sector, and its consumers mobilise green finance from the wider financial market.

  A recent initiative is in the right direction is SIDBI's announcement of 'Mission 50K-EV4ECO' in which SIDBI have exclusive funds to finance 50,000 EVs through aggregators and NBFCs. It is in pilot phase which will strengthen the EV ecosystem including uptake for 2-W, 3-W and 4-W through direct and indirect lending. Going forward, SIDBI is expected to get funds through World Bank and other multilaterals to create line of credits for further financing to EVs.

  Extension of loans by commercial banks on favourable terms as priority or infrastructure lending would be another important policy enablement by providing credit guarantees for loans to consumers with no credit history or collateral (e.g., three-wheeler drivers). Other such policy actions include aiding the development of green banks, developing robust and deep carbon markets, financing battery giga-factories, etc. Support is extended for the inclusion of MSMEs to propel the green revolution, urging more financiers to back adoption through interest subsidies.

- **Promote here-and-now actions till green technology matures:** Ethanol/ methanol and HCNG/Bio CNG blending to reduce emissions from ICE vehicles; promotion of alternate mobility-as-a-service options like pay per mile; leasing, and improving public transportation, among others can be key levers to steadily reduce emissions till the EV ecosystem builds and matures.

6. PROPOSED ACTION

6.1 Actions by businesses

- Automobile manufacturers could invest in fuel cell and battery technology. Investment in charging infrastructure is also very critical to enable transition of sector towards net zero:
  - Maruti Suzuki, India's largest automaker has stated that it will dedicate 2 trillion yen ($15.46 billion) for electrification and autonomous driving technologies. It will allocate another 2.5 trillion yen ($20.33 billion) to build battery electric vehicle plant and for renewable energy facilities.
  - Tata Power has also kicked off an ambitious nationwide plan of setting up approximately 25,000 EV charging points across the country to support faster adoption of e-mobility over the next five years.
  - Mahindra & Mahindra will make investments of approx. Rs. 10,000 crore over a period of 7-8 years for setting up the manufacturing facility, development, and production of Mahindra's upcoming Born Electric Vehicles (BEVs). Mahindra & Mahindra is also collaborating and will continue to work with Charge Point Operators (CPOs), and are expanding network and reach across the country. Also, it has announced investments of Rs 1,000 crores at Telangana for setting up new manufacturing facilities for 3W EVs.
  - Hyundai has already committed an investment of Rs 4,000 crore to come out with half a dozen model portfolios by 2028.
  - EV manufacturer Ather Energy announced that it is working to install 2500+ charging stations by end of 2023.
- Businesses can prioritise immediate actions such as ethanol/ methanol blending as they have healthy returns and immediate scalability while continuing to invest long-term in the EV ecosystem.
  - Maruti Suzuki India Ltd. (Maruti Suzuki) informed the exchanges on December 12 that it has unveiled the Wagon R Flex Fuel prototype model in Delhi.
  - Mahindra has updated the XUV700 & XUV300 to the BS6 Phase-2, RDE & E20 flex-fuel norms.
  - Tata Motors has announced introduction of its BS6 Phase II range of passenger vehicles with RDE (Real Driving Emissions) and E20-compliant engines.

6.2 Actions by CII

- The CII can play a key role in shaping and charting the path of the transition:
  - It can create awareness and sensitization across the ecosystem while stimulating green investments. There is a need for more information dispersal in the market to increase sensitization about cost of not transitioning. Example - IPCC has listed out cost of climate related events to spread awareness.
  - It can create a forum for key industry players across the value chain to participate in dialogue and align on a plan of action.
- Cross-sector partnerships could be promoted to take advantage of synergies, and thus maximise the impact of financed emissions reduction.
- CII should facilitate deliberations among industry players for ensuring a just transition such as labor force reskilling requirements, shift in jobs from the eastern coal belt to the west etc.
- It can help mobilise industry to contribute to the capacity building of the next generation of green MSMEs, helping supercharge national development and providing fulfilling livelihoods to millions of Indians.

Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society, through advisory and consultative processes.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. With its extensive network across the country and the world, CII serves as a reference point for Indian industry and the international business community.

As India strategizes for the next 25 years to India@100, Indian industry must scale the competitiveness ladder to drive growth. CII, with the Theme for 2023-24 as 'Towards a Competitive and Sustainable India@100: Growth, Livelihood, Globalisation, Building Trust' has prioritized 6 action themes that will catalyze the journey of the country towards the vision of India@100.

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CII-ITC Centre of Excellence for Sustainable Development

CII-ITC Centre of Excellence for Sustainable Development (CESD) is one of CII's 11 Centres of Excellence. The Centre is a not-for-profit, industry-led institution that helps businesses become sustainable organisations. It is on a mission to catalyse innovative ideas and solutions, in India, and globally, to enable business, and its stakeholders, in sustainable value creation. Its knowledge, action and recognition activities enable companies to be future ready, improve footprints profiles, and advocate policymakers and legislators to improve standards of sustainable business through domestic and global policy interventions.

The Centre leverages its role of all-inclusive ecosystem player, partnering industry, government, and civil society. It has been a pioneer of Climate Change, environment management systems, biodiversity mapping, sustainability reporting, integrated reporting, and social & natural capital valuation in India, thus upgrading business in India to sustainable competitiveness. The Centre operates across the country and has also been active in parts of South and South-East Asia, the Middle East, and Africa. It has held institutional partnerships and memberships of the United Nations Global Compact, Global Reporting Initiative, International Integrated Reporting Council, Carbon Disclosure Project, development agencies of Canada, the USA, the UK, and Germany.

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