

Commentary

What Policy Levers Could Address India's Automobile-Related Externalities? Insights From a Survey of Experts

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The Indian government has shown a growing recognition of the need for policy instruments aimed at addressing increasing air pollution, oil imports, and greenhouse gas (GHG) emissions associated with India's light-duty vehicle (LDV) sector. Based on the findings of a survey of Indian passenger vehicle ecosystem experts, this commentary aims to understand the potential central and state policy levers that could be used to address these three issues. The purpose of this commentary is also to highlight experts' assessments of which policy instruments they think are likely to be the most impactful. It also contrasts the findings from the expert survey with the reality of some of the policy levers that are currently being employed by the Indian central and state governments. The findings are significant as they enable an understanding of the future of the LDV sector in India and the associated energy and environmental aspects, which have global implications.

Data and Methodology

The data for this commentary was collected through a survey of 51 experts associated with India's passenger mobility ecosystem from both the for- and non-profit sectors, including manufacturing companies, power utilities, government ministries and think tanks. The survey solicited expert opinions on policy levers that could help India achieve its three goals of improving air quality, and reducing GHG emissions and crude oil imports. The respondents were first asked to rate the different policy levers on a 5-point Likert-type scale (Sullivan and Artino Jr. 2013). The respondents were then asked to select the most important policy lever in their opinion. The responses were sought for both central- and state-level policies.

Results

The survey results are highlighted in Figure 1. Figure 1a represents the response distribution to the Likert-type scale questions. Figure 1b represents the distribution of respondents when asked to select the most important policy lever. There are five points worth noting in Figure 1:

First, when asked to choose the single most important central policy lever (Figure 1b), the single most popular was feebate (39%). About 22% of respondents selected a plug-in electric vehicle (PEV) mandate as the most important central policy lever, followed closely by subsidies and higher investment in public transit, biking and walking (16%). "Ban on new ICEV [internal combustion engine vehicle] sales" and "vehicle retirement programs" were rated most important by 10% of respondents. Only 4% of respondents chose "Fuel and/or carbon tax" as the most important policy lever. It is also worth noting that none of the respondents rated any of the following three policy levers – "congestion tax," "vehicle kilometer tax," and "stricter corporate average fuel economy (CAFE) norms" – as the most important.

Second, a similar trend was seen for the Likert-type scale responses (Figure 1a), with the feebate policy lever receiving the highest number of "strongly agree" responses (71%). The response distribution for this policy lever was also found to be statistically different from the response distribution for every other policy lever.¹ The response distributions for the next two most important central policy levers identified in the survey, i.e., "PEV mandate" and "subsidies and higher investment in public transit, biking and walking," were

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not found to be statistically different.² In fact, their response distributions were not found to be statistically different from the response distributions for “stricter CAFE norms” and “vehicle retirement programs” either.³ In other words, when asked to rate these four policy levers independently, experts agreed almost uniformly that the four policies were equally able to assist India in achieving its three goals.

Third, among the various state policy levers, when asked to choose the single most important policy (Figure 1b), “non-financial and financial incentives for PEVs” was the most popular choice (39%), followed by the “PEV mandate” (27%) and “investments in charging infrastructure” (14%). The remaining two policy levers – “low emission zones” and “license plate restriction” – were rated most important by 10% of respondents. None of the respondents selected “vehicle driving restriction” as the most important state policy lever.

Fourth, on the Likert-type scale responses (Figure 1a), the response distribution for the top three most important state policy levers – incentives for PEVs, a PEV mandate, and investments in charging infrastructure – was not found to be statistically different.⁵ Thus, if multiple policy levers could be implemented simultaneously, experts would vouch equally for these three policy levers.

Fifth, among the Likert-type scale responses (Figure 1a) from for- and non-profit respondents, no statistical differences could be ascertained for any of the central policy levers.⁶ For the state policy levers, only the response distribution for “non-financial and financial incentives for PEVs” was found to be statistically different among for- and non-profit respondents.⁷ As one would intuitively expect, for-profit respondents rated this policy slightly more highly than non-profit respondents.

Additionally, we further checked experts’ opinions on the likelihood of a ban on new ICEV sales being implemented in India by 2030. Most respondents (78%) believe that it is unlikely that new ICEV sales will be banned in India by 2030. Only 6% of respondents believed that a ban is likely, with the remaining respondents indicating that they were unsure.

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¹ Mann-Whitney equality-of-medians tests between the response ratings for the feebate policy lever and each other policy lever were rejected at the 5% and below significance level.

² Mann-Whitney equality-of-medians tests between pairs of the response ratings for these respective factors could not be rejected at the 10% significance level.

³ Mann-Whitney equality-of-medians tests between pairs of the response ratings for these respective factors could not be rejected at the 10% significance level.

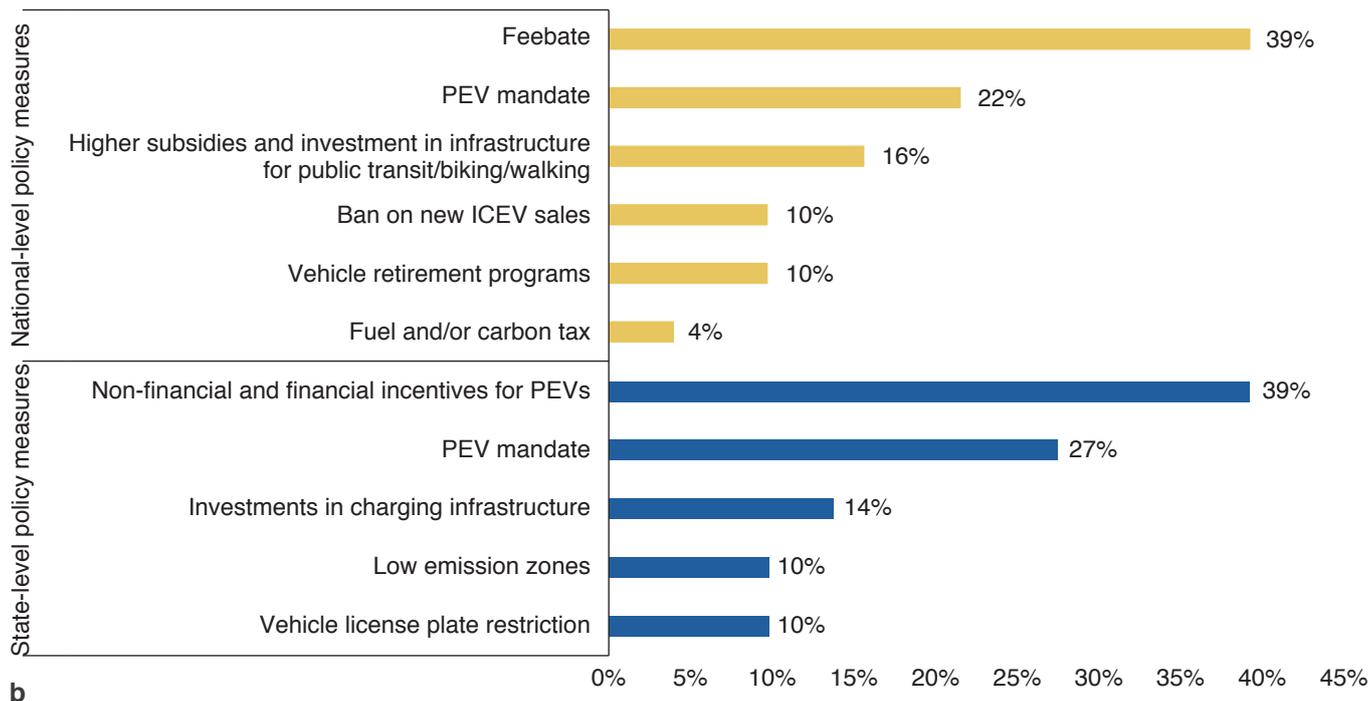
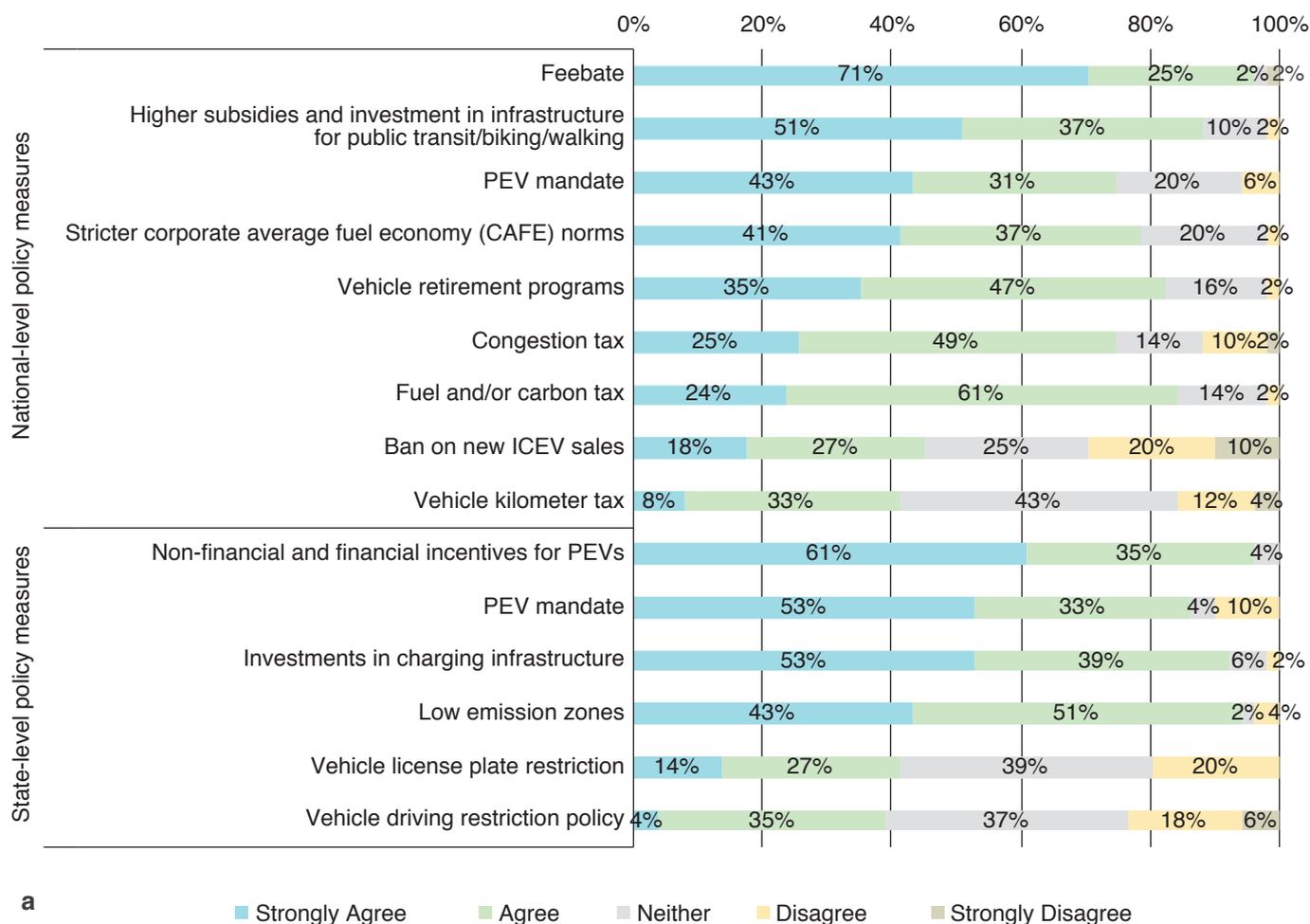
⁴ Given that the response was consistent at the central and state level, if considered worth implementing, it would be sufficient to implement PEV mandate at the central level alone.

⁵ Mann-Whitney equality-of-medians tests between the response ratings for these respective factors could not be rejected at the 10% significance level.

⁶ Mann-Whitney equality-of-medians test between the response ratings by for- and non-profit respondents on any of the central policy levers could not be rejected at the 10% significance level.

⁷ A Mann-Whitney equality-of-medians test on the response ratings by for- and non-profit respondents on this factor was rejected at the 10% significance level.

Figure 1. Respondents' agreement or disagreement on the ability of national and state-level policy measures to meet India's three goals (a) and policy measures rated most important by the respondents (b).



Concluding Remarks and Policy Implications

Most experts believe that PEV mandate and feebate policies are likely to have the greatest impact in assisting India to meet its three goals of addressing air pollution, energy security, and climate change. Categorizing the various policy levers into two groups – (i) command-and-control (CAC) and (ii) market-based instruments – a higher fraction of experts (53%-69%) believe that market-based instruments are likely to have a higher impact than CAC.⁸ However, given that CAC policies transfer the responsibility for the pain consumers might experience in terms of increased prices away from the government, they might be more likely to be adopted by the world's biggest democracy (Belzer 2007). The Indian government's consideration of the feebate policy is a case in point in this regard. It is worth noting that the government's think tank, NITI Aayog, had suggested an Indian rupee (INR) 7,500 crore (~\$1.1 billion in 2019 United States dollars [US\$]) worth feebate policy (Luthra 2018; NITI Aayog and RMI India 2017; Ganguly 2019). This revenue-neutral feebate policy would have involved increasing the taxes on ICEVs to create a surplus, which would then have been used to subsidize PEVs. However, the plan was reportedly suspended in March 2019, as it was suspected that any financial burden on automobile buyers could hurt the incumbent party's chances in the upcoming 2019 central government elections (Phule 2019; Ganguly 2019).

Regarding incentives for PEVs, it is worth noting that the Indian government recently allocated a budget of INR 10,000 crore (~\$1.4 billion in 2019 US\$) for a period of three years as part of its recent FAME-II scheme.⁹ Approximately 86% of this funding has been set aside as demand incentives for EV purchases and 10% for charging infrastructure funding (Ministry of Heavy Industries and Public Enterprises 2019).

To reduce the upfront cost of PEVs and make them more affordable, India's Ministry of Road Transport and Highways (MoRTH) recently launched a policy initiative based on the battery-as-a-service business model. In August 2020 the ministry started to allow the sale of electric two- and three-wheelers without a pre-fitted battery (Government of India 2020). MoRTH argued that, since batteries account for up to almost 40% of the cost of a PEV, if the cost of batteries were delinked from the cost of vehicles, two- and three-wheeler PEVs could cost less than their ICEV counterparts (Cruze 2020). Batteries could either be provided separately by vehicle manufacturers, or by energy service providers as a service model (Chaliawala 2020). An energy service provider could rent fully charged batteries to EV owners, thereby promoting battery swapping. A model that promotes battery swapping would also address consumer concerns around longer refueling times for PEVs relative to ICEVs.

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⁸ At the central level, the three policy levers – (i) a PEV mandate, (ii) a ban on new ICEV sales, and (iii) vehicle license plate restriction – can be categorized as CAC policies. At the state level, CAC type policies include – (i) a PEV mandate and (ii) low/zero emission zones.

⁹ FAME: Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles.



The announcement from MoRTH has, however, caused some confusion among manufacturers about whether EVs sold without batteries would qualify for subsidies under the FAME-II scheme, and whether the subsidy would be distributed between vehicle manufacturers and energy service providers (Sharma 2020). Manufacturers have also highlighted the need for clarification on issues related to battery integration, safety, warranty and standardization associated with this initiative.

Finally, the findings on the likelihood of a ban on new ICEV sales by 2030 are in line with the recent statements by the Indian Minister of Road Transport and Highways that put to rest speculation over a ban on ICEV sales (ET Bureau 2019). The minister's statement was in response to a proposal by NITI Aayog, which argued for a complete switch to electric two- and three-wheelers by 2023 (Soni 2019). The proposal had also recommended banning all internal combustion engine (ICE) three-wheelers by March 2023, and two-wheelers below 150cc by 2025.

Overall, this commentary provides insights on the potential policy levers that experts believe are likely to be adopted and be impactful in lowering the LDV sector-related contribution to India's ever-increasing air pollution, oil imports, and GHG emissions. The commentary holds value for stakeholders associated with the energy and automotive sectors, as it highlights the policy levers that might shape the future of the Indian LDV landscape. Given the size of the Indian LDV market and the corresponding energy demand, these insights have implications not only for local stakeholders but also global stakeholders. This commentary highlights the policy levers that require consideration by the global modeling community while forecasting India's future energy demand and its associated environmental impact.

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About the Project

Promoting the adoption of energy-efficient vehicles has become a key policy imperative in both developed and developing countries. Understanding the impacts of various factors on adoption rates forms the backbone of KAPSARC's efforts in the light-duty vehicle demand field. These factors include (i) consumer-related factors – demographics, behavioral, and psychographics; (ii) regulatory factors – policies, incentives, rebates, and perks; and (iii) geo-temporal factors – weather, infrastructure and network effects. Our team is currently developing models at different levels: micro-level models using large-scale data comprising new car buyers' profiles, and macro-level models using aggregated adoption data to understand and project the effects of various factors that affect the adoption rate of energy-efficient vehicles.

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