



Foreword

The changing paradigm of the mobility sector demands the urgent development of innovative and sustainable vehicular technologies. With contra indicative challenges of energy security, decarbonization, and overall economic value, the contours of technological interventions need to be precisely drawn and meticulously planned. Journal of Mobility by ARAI is a platform that keeps us abreast with the latest developments in the field of mobility.

Like the rise and ebb of pandemic peaks, it may be equally harder to picture the pathway to climate change management. In this context, Indian Oil and its R&D Centre are focusing on multiple alternatives for discovering the solutions that will initially result in flattening the emissions curve and further bending it downwards.

The journey towards net-zero begins by enhancing the energy efficiency from the existing processes & products. Differentiated fuels & lubricants by Indian Oil is a step in the direction. The flexibilities in the refineries to optimize the product slate and enhance the octane number of gasoline are other low-hanging fruits enabling energy transition. Govt. of India's mandate to increase the adoption of biofuels like ethanol, biodiesel, compressed biogas, and bio-ATF is going to change the slope of the GHG emission curve for the country during this decade. IOC is enabling such measures through its technological prowess and scale.

The disruptions envisaged through the electrification of the drive trains have brought battery-operated vehicles to the forefront. Indian Oil has been pioneering efforts in the battery space through the setting up of EV charging infrastructure at its retail outlets. Having understood the constraints around lithium availability, Indian Oil is exploring other innovative chemistries which shall qualify as the optimal solution for enabling e-drives but without centralizing our dependence on "few select countries", thereby shifting the geo-political equilibrium. The metal-air batteries consisting of a recipe based on abundant aluminum or zinc reserves are being explored to realize our dream of electric mobility.

Hydrogen has emerged at the centre stage and the Indian journey of green hydrogen is set to transform the mobility sector as well. Our recent experiments with HCNG fuel in 50 buses in Delhi have demonstrated significant emission and fuel economy benefits. The country's first fuel cell bus development and demonstration program by Indian Oil R&D would be hitting the ground as we expect the prototypes on the road by the end of this year.

The Indian landscape is under metamorphosis and this journal is a great link to capture the developments happening in the area of advanced mobility in the country. Apart from the industrial community, the extended outreach of this Journal to the budding scientists & engineering students would really accelerate their interest in selecting the mobility field as their career path towards the collective realization of the net-zero goal through frugal innovation.

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