Network Readiness for 3rd Generation Mobility

8th Working Group Meeting (N)

Tuesday, 23rd December 2025 | 10 AM
Le Meridien, New Delhi, India

1 OVERVIEW

Indian surface transport and mobility is entering its 3rd generation, driven by rising user expectations and a significant shift from second generation, digitally isolated ICE vehicles to network-connected vehicles. Despite massive investments in infrastructure across India, the combined mobility experience (city-highway) for end users remains disappointing and misaligned with national economic ambitions and individual road/transport user expectations.

By 2030, in the mobility shifts EVs are expected to penetrate: 30% in private cars, 70% in commercial vehicles, 40% in buses, and 80% in two- and three-wheelers (as flagged by NITI Aayog and MoRTH). This is expected to consolidate to an average penetration of 30% across all segments. Even under conservative estimates, assuming adoption averages between 15% and 17%, approximately 60.18 million non-ICE connected vehicles would be on Indian roads by 2030. These vehicles will require next-generation network connectivity for tolling, charging, parking, violation monitoring to meet user's expectations and enforcement agency regulations. The Group of Transport Experts (GTE), being constituted by the PMO under National Master Plan, that are expected to lead into the formation of an apex Transport Planning Authority, tasked with proposing transition plans covering data science, network optimization, supply chain management and multi-modal transport planning for this generational shift.

The 8th Network Working Group Meeting aims to accelerate the technical and commercial prototyping to achieve interoperability between 3G Mobility Network infrastructure and connected vehicles. As a Government of India-supported pilot initiative, NHEV is well calibrated with upcoming deployment planned for 2026, including: 5200 E-cars / E-SUVs, 520 E-buses, 1000 Electric trucks & 528 RSA Vehicles. These deployments will integrate emerging technologies and validate large-scale interoperability.

NHEV Technical Trial Runs (I, II, III): Established the technical interoperability viability & bankability of 3G E-Highway Management System. Under EoDB, 3 technical trials (TTR) were conducted by NHEV to evaluate commercialization of electric long-range SUVs, e-Buses and Electric Trucks, operating with passengers and commercial loads. These trials successfully demonstrated technical feasibility of ADAS and other advance safety sensors for fleet operators, achieving near commercial parity with 3G network for intelligent transport system.

- **TTR – I** (2020) between Delhi & Agra commercially prototyped E-Bus and Cars for fleet use.
- **TTR – II** (2022) between Delhi & Jaipur commercially prototyped E-Bus and SUV for fleet use.
- **TTR – III** (2024) between Chennai & Trichy commercially prototyped E Trucks for freight use.
- **TTR – IV** (2026) is to compare electric charging & swapping trucks with H_2 fuel-cell trucks.

Real World Challenges Vs Strategic Insights for V2X network solutions

Very few high-tech V2X-integrated infrastructures have achieved viability, bankability, scalability, or profitability without government support. However, building a PPP resilience for large-scale V2X integration and deployment seems inevitable. This necessitates sequential and consistent deployment of multiple vehicle versions to achieve seamless smart-infrastructure and connected vehicle V2X interoperability.

V2X INFRA: Bharatmala & Sagarmala routes of NHEV 5500 Km electric highways are opening their integrations before the 8th Working Group Meeting to meet expectations and deal with major on-ground implementation challenges in deploying Video Incident Detection and Enforcement System (VIDES), Vehicle Speed Detection System (VSDS), Traffic Monitoring Camera System (TMCS) from NHAI - Advanced Traffic Management System (ATMS) 2023 guideline. Challenges coupled with factors beyond the control of the three key stakeholders of mobility — (1) **Highway Infra Operators**, (2) **Enforcement Agency & State RTO/Police**. (3) **Vehicle User and Manufacturer** (OEM).

CONNECTED VEHICLE: NHEV partners have already prototyped major OBU and ADAS advancements along with other circumstantial charging support tech, devices on cars, SUVs, trucks and buses. This WGM will also demonstrate current commercial prototyping of Electric trucks, buses, logistics vehicle and long-range passenger SUVs paired with gantry and V2X to achieve a common Connected Commercial Vehicle (CCV) Protocol.

OUTCOME: Take away of this WGM aims to offer upgradation pathways along with Ease of Doing Business for OEM, Tech-Service Providers and operators to deliberate a systematic approach for planning, deploying, and operating them. These milestones include **Affirmation** from **OEM & Fleet operator's** in principal interest in CCV certification & deployment. Furthermore, **Infrastructure Upgradation**, which assesses suitable digital infrastructure and asset procurement for V2X freight and connected vehicle usages; **Commercial Equivalence** for stakeholder significantly accelerates decision making towards transition from Diesel; and finally, Financing Operations from **Users and Beneficiaries** by giving **Informed, Intelligent and Instant** RSA and ORS on NHEV Highways.

2 VIKSIT BHARAT NATIONAL MASTERPLAN Context

This WGM is being calibrated to clear a pathway for advancement of network architecture, connectivity frameworks, and protocols supporting NHEV 3rd Generation (3G) Connected Mobility infrastructure and Vehicle through presentations on:

V2X Technology Transition: A 'why to prototype?' for stakeholders
Electric and 3rd Gen - Level 3 Autonomous vehicles are equipped to become V2X connected vehicles but due to lack of smart & responsive infrastructure, their advancement stands halfway. This technical segment reveals stakeholder benefits being delayed and capitalized by NHEV partners by optimization of E-routes.

Devices & Products: Connected Commercial Vehicle (CCV) Protocol
The CCV Protocol is device-agnostic and brings vehicles and infrastructure onto a common communication framework, addressing a decade-old challenge that was resolved during the NHEV pilot. This technical segment evaluates various technically and commercially available devices and OBUs to ensure maximum optimization, assetization, and monetization of investments made in their installation across vehicles and highways.

Services & Operations: RSA and ORS are on OEMs and Vehicle Users' checklist!
Informed, Intelligent and Instant Road Side Assistance **(RSA)** has become a must-have checklist item for vehicle buyers across both private and commercial usage. While OEMs have started developing unique prepositions of **On-Road Services (ORS)** for their EVs and Hybrid vehicles, paired with RSA, to ensure non-ICE vehicles do not get stranded without support on highways due to lack of service stations and repair expertise.

3. Participants of 8th WGM - Network Group

Prime Minister's office has lately emphasized the need for mid-course correction capabilities by breaking silos and increasing Inter-ministerial and Inter-state brain storming for data science, transport network optimization and multi-modal transport planning. This WGM participants primarily include currently known Transport Experts who closely coordinate among national agencies from institutions, departments or joint task forces comprising members from stakeholders such as NITI Aayog, NHEV, MoRTH, IHMCL, NHLML, NHAI and ITS for policy planning and highway related upgradations and management with state NIC and RTO for enforcement and responsive implementation. The WGM also includes private sector participants from highway operators, vehicle manufacturers, logistics service fleet operators, charge point operators, tech companies as well as representatives from Ministry of Electronics and Information Tech (MeITY)and India AI Mission, DST, CSIR, O/o Principal Scientific and Economic Adviser to the Prime Minister. Minute of deliberations from this meeting and initial formations are expected to contribute in constitution of a Group of Transport Experts (GTE) as an apex Transport Planning Authority for aviation, highways, shipping, rail and urban planning.