

## **Workshop Proceedings**

### ***Energy Transition in Transportation: Plausible Roadmaps for India***

**Organized by:** Ashoka Centre for a People-Centric Energy Transition (ACPET)

**Dates:** 15<sup>th</sup> May 2025

**Venue:** Willow Hall, India Habitat Centre, New Delhi

### **Opening Session: Transport Sector and Energy Transition in India**

This inaugural session set the stage for a deeper discussion on how India's growing transport sector can align with the country's net-zero ambitions. Shri Rajnath Ram, Advisor (Energy), NITI Aayog, opened the session by emphasizing the significance of the transport sector in India's economy and its equally serious environmental impact. Citing India's Biennial Update Report, he pointed out that transport is responsible for approximately 14% of the country's total greenhouse gas emissions, with nearly 90% of that coming from road transport alone.

Dr. O.P. Agarwal, Professor of Practice - IIT Roorkee, followed with a striking narrative on the trajectory of motorization in India. Using Delhi as an example, he illustrated that from 1981 to 2021, the city experienced a population growth of 105% but a staggering 6270% increase in vehicle registrations. This explosion in private vehicle ownership, driven by urban sprawl and socio-economic aspirations, has made Indian cities increasingly car centric. While electrification is often hailed as a silver bullet, Dr. Agarwal argued it cannot alone address the broader issues of traffic congestion, spatial inefficiencies, and environmental degradation.

The discussions also covered the inefficiencies in India's freight movement where road haulage dominates despite rail being far more energy efficient. Panellists called for an urgent modal shift in both freight and passenger transport. A multi-layered approach was proposed: avoid unnecessary trips, shift to low-emission modes like public and non-motorized transport, and improve the remaining vehicle stock.

Another key insight came from Mr. Vaibhav Chaudhary, Director, ACPET, who stressed the importance of behavioural dimensions in transport modelling. Traditional models often fail to capture how people make travel choices, and he recommended integrating dynamic policy tools and real-time data to better predict and influence demand.

The session concluded with an open discussion that included questions about whether mode shift is realistic without significant investment in Tier 2 and Tier 3 cities, and concerns over the poor quality of existing transport data. All participants agreed on the urgent need for a systems-level strategy combining behavioural insights, robust data, institutional reforms, and infrastructure improvements.

### **Key Points:**

- Transport is one of India's fastest-growing sources of emissions.
- Electrification must be complemented with demand reduction and mode shift strategies.
- Urban planning should prioritize people, not vehicles.

- Behaviourally informed models can better capture travel choices.
- Institutional reform is critical for effective implementation.

### **Session 1: Levers of Transport Sector Modelling**

This session brought together expert perspectives on advancing India's transport sector modelling to better support its decarbonization goals. With rising emissions and evolving mobility demands, the session highlighted the urgent need for models that are not just technically robust, but also socially relevant and policy responsive.

Dr. Anandajit Goswami, Research Fellow, ACPET opened with a call to reimagine mobility systems through a socio-ecological lens. He encouraged moving beyond traditional modelling templates and called for frameworks that integrate urban design, ecological systems, and social behaviour. Drawing inspiration from cities like Chengdu, he emphasized that radical shifts in land-use planning can serve as levers for decarbonization.

Mr. Nitin Bajpai, Manager, Vasudha Foundation presented a hybrid modelling approach combining top-down economic indicators with bottom-up sectoral data. He outlined the levers in current models: modal shifts, fuel transitions, and technology adoption. He emphasized the need to contextualize projections using country appropriate benchmarks, suggesting that China offers a more relevant comparator than European nations. He also pointed to policy initiatives like Viksit Bharat 2047 are essential non-technological levers.

Mr. Sharif Qamar, Associate Director, TERI presented TERI's modelling tools, highlighting recent efforts to improve model accuracy using primary data from a national vehicle utilization survey. His presentation emphasized the importance of validating assumptions such as vehicle efficiency or fuel use against real-world data to maintain policy credibility. He acknowledged persistent data gaps in freight and maritime transport and suggested improved coordination with government agencies like NITI Aayog to standardize data collection across sectors.

Ms. Navya, Junior Research Associate, ACPET introduced ACPET's modelling work using the LEAP platform. Her presentation illustrated how ACPET's bottom-up model integrates energy demand, emissions, and externalities such as health impacts into a long-term planning framework. By comparing three scenarios (Business-as-Usual, Policy, and Ambitious), she demonstrated how progressive targets like EV30@30 can significantly alter India's emissions trajectory. LEAP's ability to capture co-benefits, such as improved air quality and reduced disease burden, was highlighted as a major advantage.

The session also included strong contributions from discussants including Mr. Vaibhav Chowdhary who challenged the traditional siloed focus on emissions and advocated for broader integration of employment, equity, and economic outcomes. Concerns were raised about outdated assumptions such as ever-increasing vehicle efficiency and the need to "ground-truth" projections with real-world conditions. Questions were also posed about the timelines and feasibility of adopting advanced technologies like hydrogen and the fiscal impact of phasing out fossil fuel tax revenues.

### **Key Takeaways:**

- Transport models must go beyond emissions to integrate jobs, equity, health, and access.

- India needs context-specific modelling benchmarks; global assumptions may not hold.
- Validation with real-world data is essential to build policy trust and model reliability.
- Modal shifts, fuel diversification, and behaviour change are all necessary to meet net-zero goals.
- The modelling community must adopt imaginative, inclusive, and interdisciplinary approaches to support India's just energy transition

## Session 2: Role of Behavioural Nudges in Sustainable Mobility

The second session explored the underutilized potential of behavioural nudges to support cleaner and more inclusive transport systems. Ms. Ilika Mohan, Research Manager, ACPET introduced the concept of nudging as a way to influence choices through subtle design and messaging without restricting choices. This includes measures such as promoting carpooling, providing real-time information, or redesigning streets to favour pedestrians and cyclists.

Ramit Raunak, Associate, RMI India presented the **Shoonya Campaign**, a collaborative effort with NITI Aayog aimed at promoting zero-emission mobility. He showcased how financial and informational nudges such as highlighting cost savings or organizing test drives for students can accelerate electric vehicle (EV) adoption. Importantly, he emphasized that nudges work best when the alternative (like EVs or public transport) is already accessible and attractive.

Vaibhav Kush, Researcher, ICCT elaborated on how spatial and visual cues in urban environments can act as subconscious nudges. In a pilot project in Gurgaon, for instance, roadside displays showed real-time vehicle emissions, prompting drivers to adjust their behaviour. He also discussed Low Emission Zones (LEZs) as spatial nudges, using clear markings, greenery, and differentiated lanes to create more inviting conditions for walking, cycling, and clean mobility.

Discussions raised important concerns around social equity and climatic conditions. Dr. Rahul Chakraborty, Assistant Professor, Shiv Nadar University argued that India's climate, especially heat and humidity, makes non-motorized transport difficult. Vaibhav Kush countered that well-designed shaded walkways and cooling materials can overcome these barriers what appears as a “climate problem” is often a design problem.

The policy perspective, brought in by Mr. Vaibhav Chaudhary and a Mr. Varun Agarwal, Senior Project Associate, WRI reinforced the point that nudges should support not replace regulatory and financial measures. Pricing policies such as congestion charges or parking fees were also discussed as “hard nudges” that need to be framed well and linked to tangible public benefits.

The session concluded with strong support for developing city-specific pilot projects, integrating nudges into national policies like the National Electric Mobility Mission, and advancing evaluation tools that combine qualitative and quantitative methods.

### Key Points:

- Behavioural nudges offer cost-effective, people-friendly tools to support cleaner mobility.
- Successful nudges require supportive infrastructure and policy context.

- Design interventions can overcome social and climatic barriers to walking and cycling.
- Measuring the long-term effectiveness of nudges is essential.
- Rural areas and marginalized groups must be included in nudge-based strategies.

### **Session 3: Socio-economic Implications of Transport Decarbonization**

This session addressed a crucial but often overlooked aspect of transport transition its economic, social, and health implications. Moderated by Mr. Vaibhav Chowdhary, the discussion began with Mr. Venugopal Mothkoo, Senior Specialist, NITI Aayog, who pointed out that while environmental and technical modelling are advancing, socio-economic dimensions such as employment, spatial equity, and real-world implementation challenges are still poorly integrated.

A central discussion revolved around what constitutes a productive transport investment. Mr. Venugopal illustrated this with the example of metro systems. If a metro is well-utilized and enhances urban connectivity, it is a productive investment. If not, it's a sunk cost. Transport interventions, he argued, must be assessed for their social and economic returns not just emissions reductions.

Dr. Aishwarya Ramachandran, Research Associate, ACPET presented an exploratory study linking emission reduction pathways with health outcomes. She highlighted how improving air quality and increasing physical activity through walking and cycling can reduce chronic illnesses. However, most health studies are focused on Western contexts. Dr. Ramachandran called for a national health and climate model tailored to Indian realities, leveraging tools like the India Energy Security Scenarios (IESS) and AI/ML based analysis.

Ms. Priyal Shah from WRI India presented findings on the risks faced by Micro, Small, and Medium Enterprises (MSMEs) in the auto sector. As the industry moves toward electric mobility, low-skilled workers and small suppliers may lose out unless they receive targeted support. She called for circular economy strategies and gender-responsive planning to ensure that no one is left behind.

The session reinforced the importance of bridging macroeconomic models with grassroots insights and called for stronger connections between technical modelling, policy planning, and real-life outcomes on health, jobs, and equity.

#### **Key Points:**

- Socio-economic impacts of transport transition on health, jobs, and equity need better integration in models.
- EV adoption may disrupt MSMEs and informal workers without support.
- Active transport has major but under-explored health co-benefits in India.
- Real-world implementation and public utility of infrastructure should be central to investment planning.
- Inclusive policies require disaggregated data and cross-sector collaboration.