CAREC
Central Asia Regional Economic Cooperation Program

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Emerging Areas and Utilization of Innovative Technologies

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MIDTERM REVIEW OF CAREC TRANSPORT STRATEGY 2030: INTEGRATION OF EMERGING AREAS

- **The CAREC Transport Strategy 2030 recognizes emerging areas as critical drivers of transformation:**
  - Digitalization
  - Artificial Intelligence (AI)
  - Big Data Analytics
  - Intelligent Transport Systems (ITS)
  - Energy transport integration and other innovations

- Emerging areas will work closely with the Road Working Group and Smart Mobility Team to integrate digitalization, AI, and decarbonization solutions into transport planning and operations across CAREC's transport systems.

BENEFITS OF EMBRACING INNOVATION IN TRANSPORT IN THE CAREC REGION

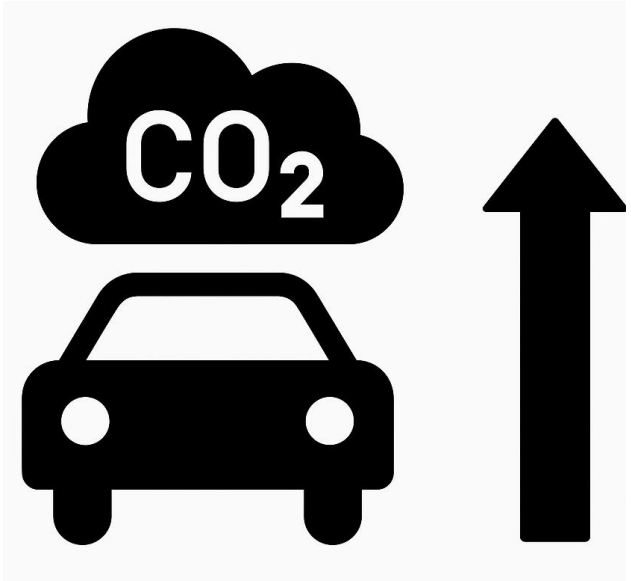
- Enabling Smarter, More Connected Transport Systems
  - Optimize operations through real-time data and predictive analytics
  - Reduce trade and logistics costs via smarter scheduling and routing
  - Enhance corridor performance and multimodal integration
  - Improve asset utilization and maintenance planning
  - Address high transport costs due to vast geography and limited connectivity

- **Why It Matters?**
  - These tools are reshaping how infrastructure is designed, operated, and maintained.
  - A forward-looking approach is essential to integrate these technologies across the region.

ONGOING/PLANNED ACTIVITIES

❑ CARBON PRICING IN TRANSPORT

- Why Focus on Carbon Pricing? - Transport is one of the largest sources of GHG emissions globally.
- Carbon pricing (e.g., carbon taxes, emissions trading systems) is a proven tool to:
  - Incentivize emissions reduction
  - Drive green innovation
  - Generate revenue for reinvestment



➢ OBJECTIVE OF THE STUDY

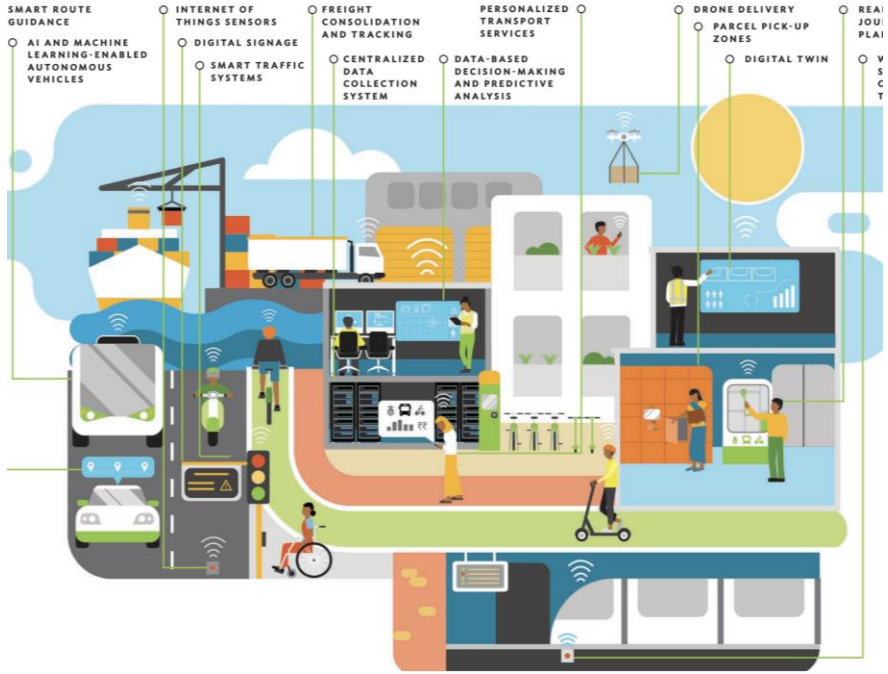
- Assess global trends and best practices in transport carbon pricing
- Identify implementation pathways for CAREC countries
- Unlock new business models and finance mechanisms for low-carbon transport

KEY CONTRIBUTIONS OF THE STUDY

- **Policy Gaps & Reform Opportunities**
  - Identify gaps in existing frameworks and opportunities for tailored carbon pricing.
- **Investment & Innovation**
  - Promote low-carbon tech (EVs, renewable-powered transport).
  - Enable reinvestment of carbon revenues in green infrastructure.
- **Cross-Sectoral Integration**
  - Link transport with energy & urban development (e.g., EV charging via solar/wind).
- **Data-Driven Planning**
  - Build evidence base for policymaking and project risk/benefit assessment.
- **Capacity Building & Consensus**
  - Engage stakeholders via workshops and consultations.
  - Strengthen regional coordination and implementation readiness.

ADVANCING DIGITALIZATION, ARTIFICIAL INTELLIGENCE IN THE REGION

- **Digitalization Toolkit for Sustainable Corridor Management**
  - Provides tools for real-time monitoring, smart asset management, and digital freight logistics
- **AI Deployment Roadmap for CAREC Transport Sector**
  - Defines phased AI adoption in traffic management, logistics, and asset optimization
  - Identifies institutional, technical, and regulatory requirements for implementation
- **Individual Decarbonization & Digitalization Roadmaps**
  - Tailored for each CAREC member country
  - Provide clear pathways for digitalizing national transport systems
  - Identify priority actions, policy reforms, and investment needs
  - Ensure alignment with CAREC's regional strategies on climate resilience and digital transformation



TRANSPORT–ENERGY INTEGRATION

“ Leveraging clean energy to power the future of mobility ”

❑ **Hybrid Renewable-powered EV Charging**

- Emerging models combine solar, wind, and grid-tied systems to ensure stable and scalable EV charging infrastructure

❑ **Hydrogen as a Fuel**

- Less suitable for small passenger vehicles, but high potential for heavy-duty modes such as freight trucks, rail, and maritime transport
- Key challenges include:
  - ✓ Scalable production and distribution of green hydrogen
  - ✓ Development of refueling and storage infrastructure

AI-POWERED TRANSPORT SYSTEMS

“ Applying AI across the transport lifecycle ”

- **AI Agent for Traffic Operations**
  - Optimize city-wide traffic signals to reduce total congestion
  - Predict, detect, and respond to natural disasters and extreme weather events

- **AI Agent for Transport Infrastructure Development**
  - Assist in cost-efficient, functionally enhanced design review
  - Improve safety and efficiency in construction management

- **AI Agent for Operations & Maintenance (O&M)**
  - Recommend optimal maintenance schedules, technical methods, and resource allocation strategies

EMERGING CONNECTIVITY AND AUTOMATION TECHNOLOGIES

“ Building smarter, connected, and automated transport futures ”

- **Low Earth Orbit (LEO) Satellite Internet**
  - Enables “Internet Everywhere”, providing cost-effective digital monitoring for remote and hard-to-reach areas

- **Vehicle-to-Everything (V2X) and Autonomous Vehicles (AVs)**
  - Pilot implementations ongoing in selected countries for safe and connected self-driving systems

- **Advanced Air Mobility (AAM)**
  - Pilot applications in select countries for goods transport via UAVs and eVTOLs, supporting last-mile logistics innovation