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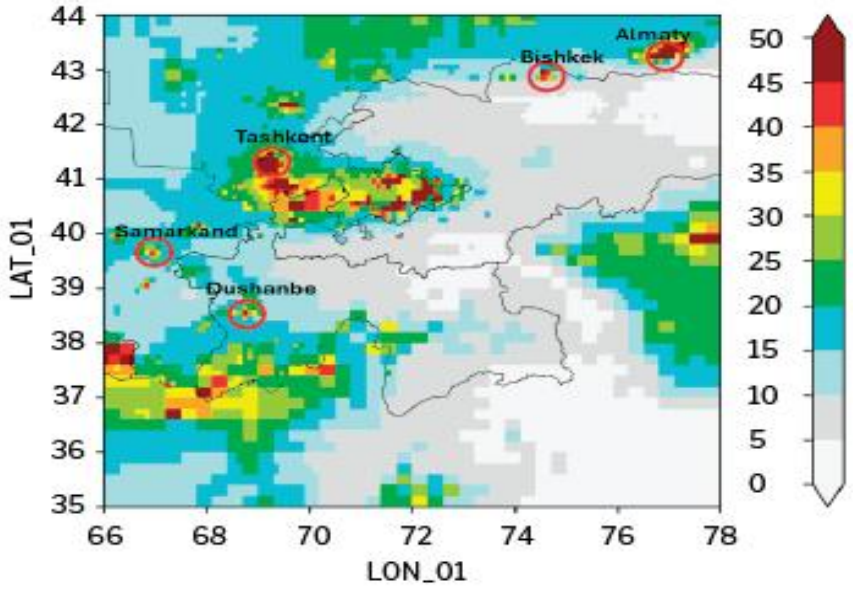
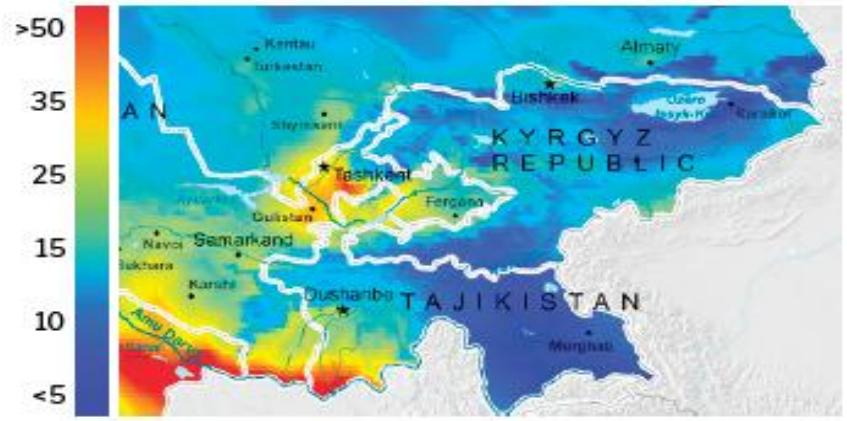
Air quality management in Central Asia: setting national priorities

May 7th, 2026

Concentrations of $PM_{2.5}$ in 2020 (modeled - top) and 2022 (satellite - bottom) (µg/m³)





- Satellite imagery and global models show significant spatial diversity in $PM_{2.5}$ levels, with lower concentrations in rural areas and highest in major urban areas.
- Satellite estimates highlight additional high soil dust areas not fully captured by models.
- Lack of rural $PM_{2.5}$ measurements limits comprehensive model validation, but urban monitoring comparisons show good agreement despite emission inventory uncertainties.

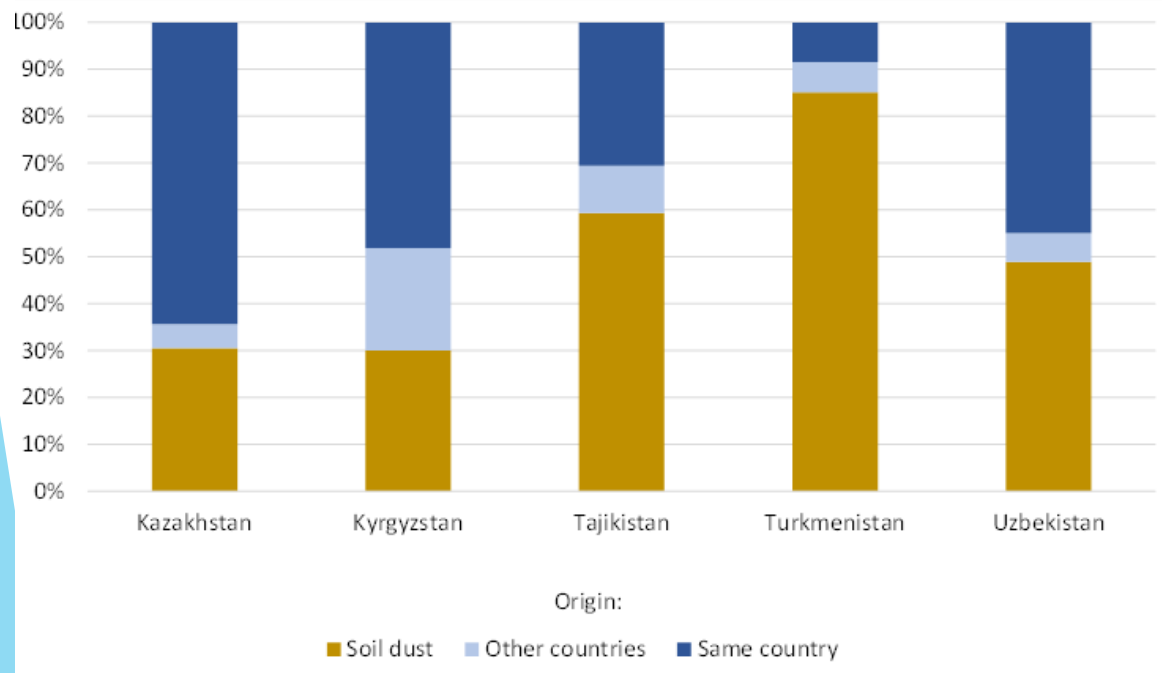
Global burden of air pollution and in Central Asia (CA)

The health costs of $PM_{2.5}$ ambient air pollution in Central Asia are estimated to range between US$15.2 and US$21.7 billion per year, which is equivalent to 3-5 % of regional gross domestic product (GDP) in 2022.

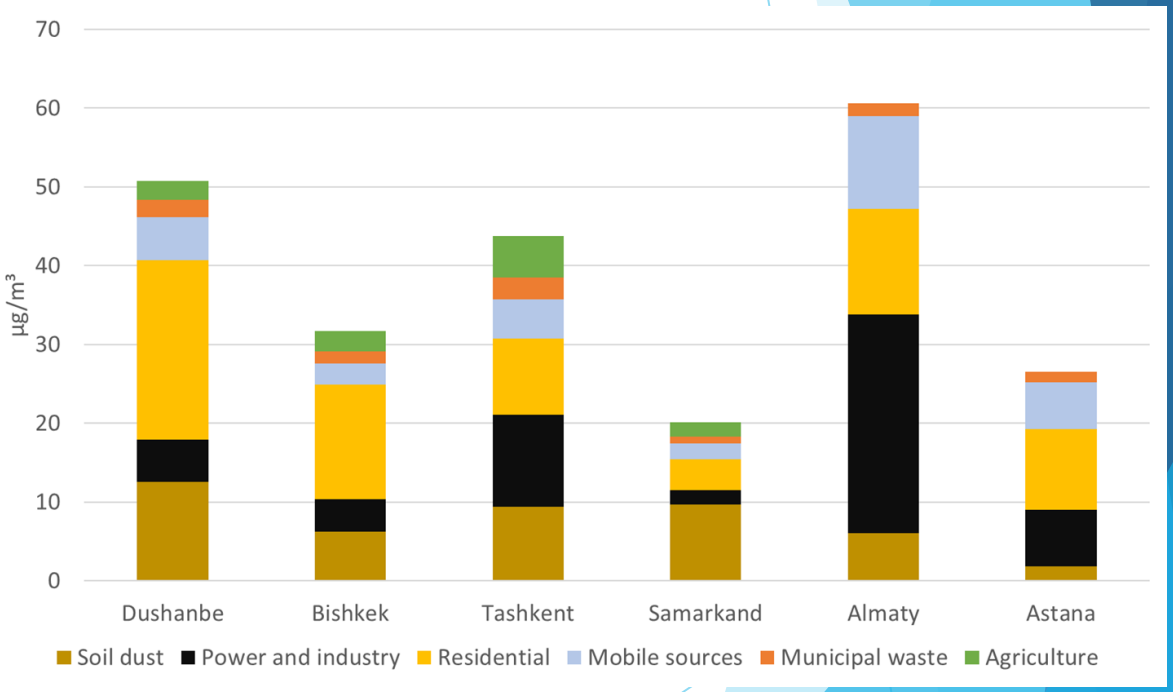
The impact will increase under business-as-usual scenario

Source apportionment in Central Asia: national and urban levels analysis

Soil dust and transboundary air pollution contribute significantly to $PM_{2.5}$ population exposure in CA



Sector contributions to $PM_{2.5}$ exposure in six major CA cities, 2020 (2018 for Almaty and Astana)



$PM_{2.5}$ population-weighted exposure reduction potentials by 2040

	Bishkek	Dushanbe	Tashkent
$PM_{2.5}$ population-weighted exposure reduction potential of urban measures			
Share of total reduction potential	58%	76%	27%
Key sector delivering the reductions	Road transport	Residential heating	Road transport
$PM_{2.5}$ population-weighted exposure reduction potential of outside (urban) measures			
Share of total reduction potential	42%	24%	73%
Key sector delivering the reductions	Residential heating	Residential heating	Industry
Projected $PM_{2.5}$ population-weighted annual exposure after implementing all cost-effective measures in 2040, in $\mu g/m^3$			
	22	**27**	**24**
Source: World Bank 2025			

Recommended actions for AQM in Central Asia

Institutional, legal, and policy framework

- Strengthen governmental roles, responsibilities, and structures to support an effective AQM system.
- Establish interministerial AQ Coordination Committees.
- Strengthen strategic AQM planning on national and local levels adopting the airshed approach.
- Review and update sectoral legislation for the key emitting sectors.

AQ standards

- Reassess the list of pollutants for which AQ standards are adopted.
- Update AQ standards in line with WHO recommendations.

Technical components of AQM

- Expand and upgrade AQ monitoring.
- Strengthen technical capabilities of the AQ monitoring networks.
- Update and strengthen the emission inventory systems to meet international best practices.
- Strengthen capacities for AQ modeling.

Communication

- Strengthen stakeholder engagement.
- Support awareness raising and education.

Regional cooperation

- Set up a platform/mechanism for information and knowledge exchange.
- Share the implementation of some AQM activities on a regional scale.
- Agree on actions to reduce transboundary air pollution.

Source: Original compilation.

High Level Regional Dialogue on AQ

1. June 2024 Tashkent
2. April 2026 Astana

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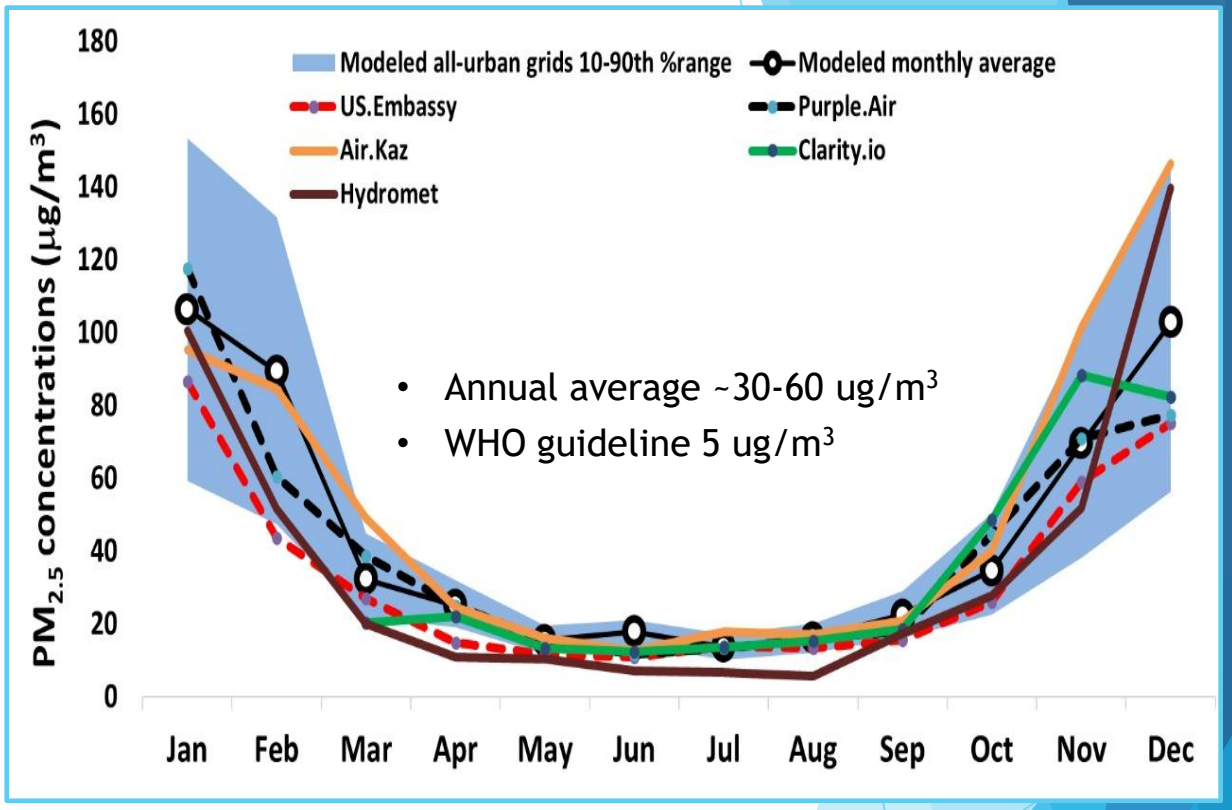
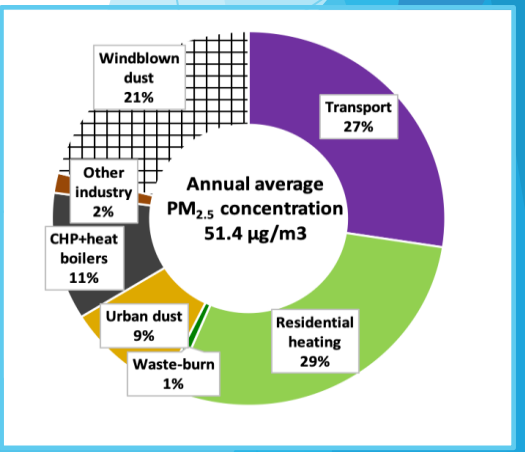
Policy reforms to unlock private investment in clean air

POLLUTION SOURCE TYPE	KEY CHALLENGES	ENABLERS	FINANCING STRATEGIES
Power plants, heavy industry	➢ High capital costs for cleaner technologies ➢ Complex regulatory requirements ➢ Weak financial returns from emissions reduction	➢ Consistent emissions policies and long-term government commitments ➢ Eliminate fossil fuel subsidies	➢ PPPs ➢ Green bonds ➢ Emissions trading schemes
Households, agriculture, SMEs	➢ Small-scale interventions - Limited revenue models ➢ Lack of access to finance	➢ Consumer finance mechanisms ➢ Targeted subsidies and incentives for cleaner technologies	➢ Microfinance schemes ➢ Concessional loans ➢ Results-based financing
Urban transport, waste management	➢ High infrastructure costs ➢ Complex stakeholder involvement	➢ Clear urban air quality goals integrated into city planning ➢ Vehicle emissions standards	➢ PPPs ➢ Municipal bonds ➢ Blended finance ➢ Congestion pricing revenues
Natural dust, greening	➢ Regional in nature ➢ Land ownership	➢ Monitoring ➢ Long-term government commitment to cooperation	➢ Regional emission trading schemes ➢ Carbon finance ➢ Incentives for regional projects from MDBs

Sour

A Problem Well Defined is a Problem Half Solved - Kyrgyzstan AQIP





- Weak institutional capacity, and lack of coordination between ministries/agencies
- Weak enforcement of current pollution control regulations
- Lack of data – reliability and coverage (both emissions and ambient AQ)

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KYRGYZ REPUBLIC AIR QUALITY IMPROVEMENT PROJECT

PROJECT AMOUNT
$50 million

REGIONS SUPPORTED
BISHKEK & the entire KYRGYZ REPUBLIC

SECTORS COVERED

- ENERGY (RESIDENTIAL HEATING)
- URBAN GREENING
- URBAN IRRIGATION

ACTIVITIES

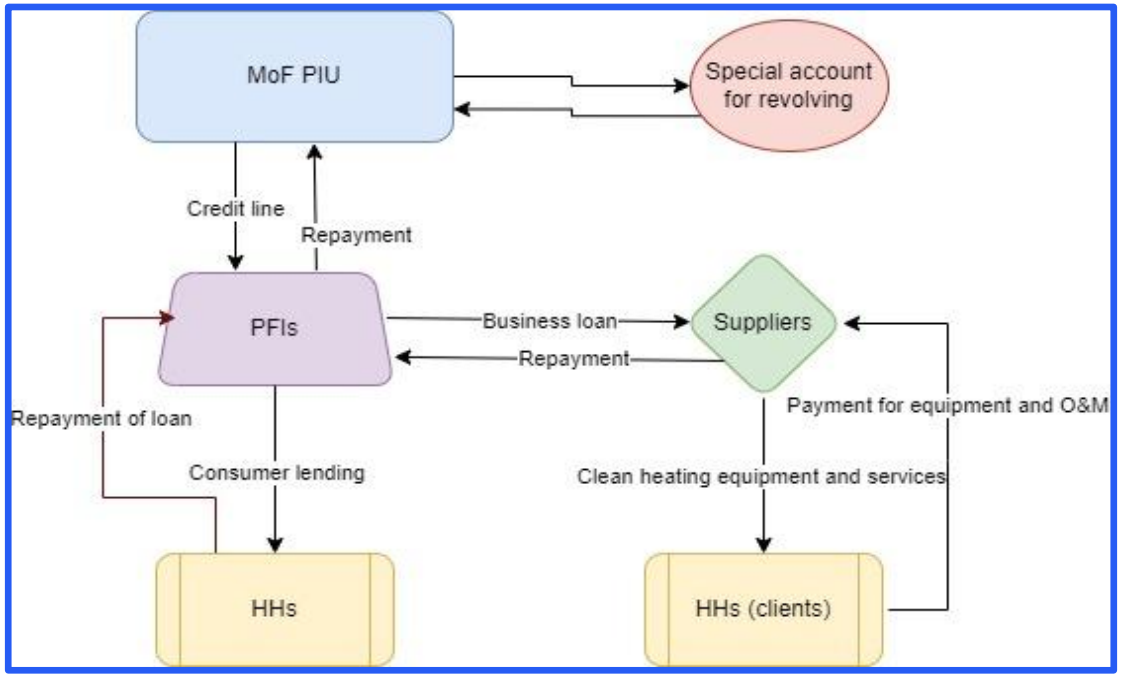
- Strengthening the country's air quality management systems
- Advancing clean residential heating practices through sub-loans to households
- Improving urban greening and urban irrigation in Bishkek

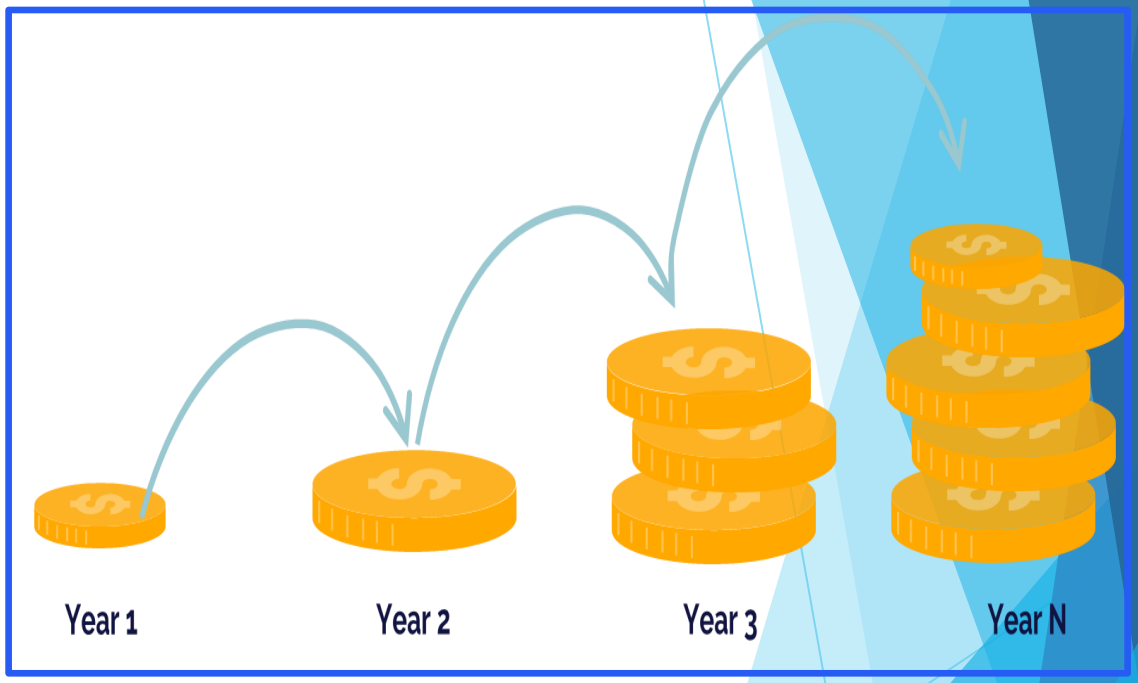
EXPECTED RESULTS

- 11 modern automatic monitoring stations installed throughout the country
- $34.2 million provided as sub-loans to households to support adoption of clean heating
- 13 ha of new linear green space created
- 21 new bore wells installed to augment irrigation water supply
- $PM_{2.5}$ emissions reduced by 2030: 10,520 metric tons
- GHG reduction reduced by 2030: 2,720,000 metric tons
- Comprehensive Air Quality Report published every two years

PROJECT DURATION
2024-2030

Innovative Financing for Clean Household Heating through Revolving Mechanism





- The initial investments will support 13,000 HHs during the project duration with scale-up to 25,000 within 10 years of implementation.
- The proposed scheme finances clean heating options through loans, including 5% co-financing from the private PFIs' own resources, thus leveraging additional US$2.4mln.

E-Mobility and private sector motivation in Kazakhstan and Uzbekistan

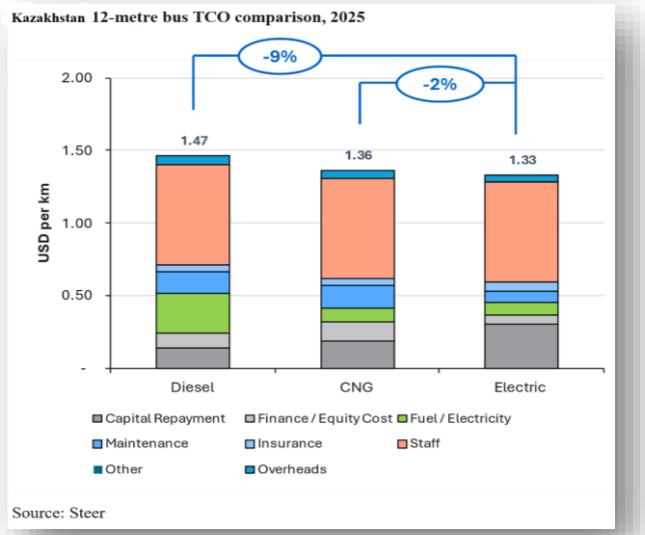
Electric buses, taxis, and delivery vehicles reduce tailpipe emissions significantly, improving air quality in dense urban areas, especially along transport corridors.

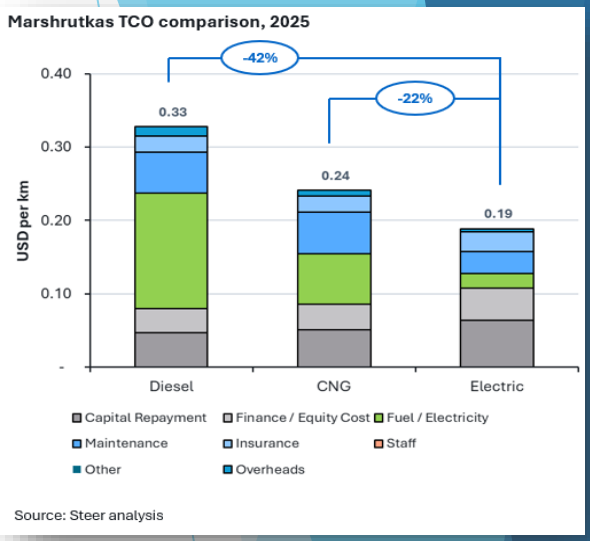
- Example impact of introducing 100 e-buses:

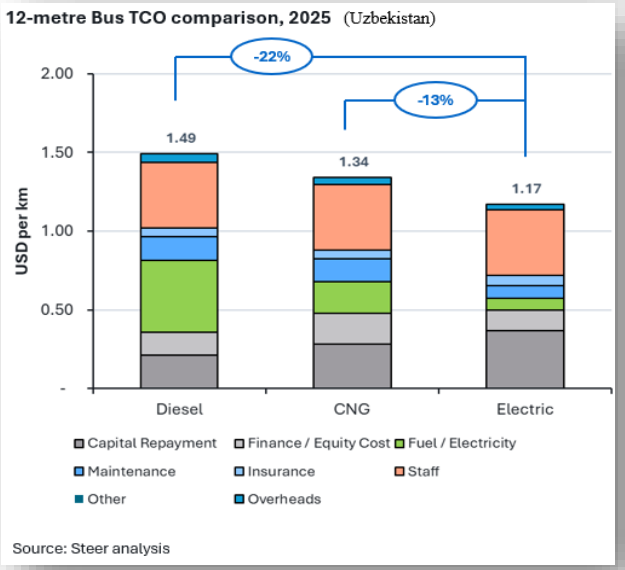
- Replace ~5,000 car trips/day (50 per bus), avg. car trip 8 km; diesel bus 250 km/day.
- Avoided car travel: ~14.6 million km/year →
  - ~2,628 tCO_2/year & ~292,000 kg PM2.5/year avoided.
- Avoided diesel bus emissions: ~9.1 million km/year →
  - ~10,950 tCO_2/year and ~1,368,750 kg PM2.5/year avoided.

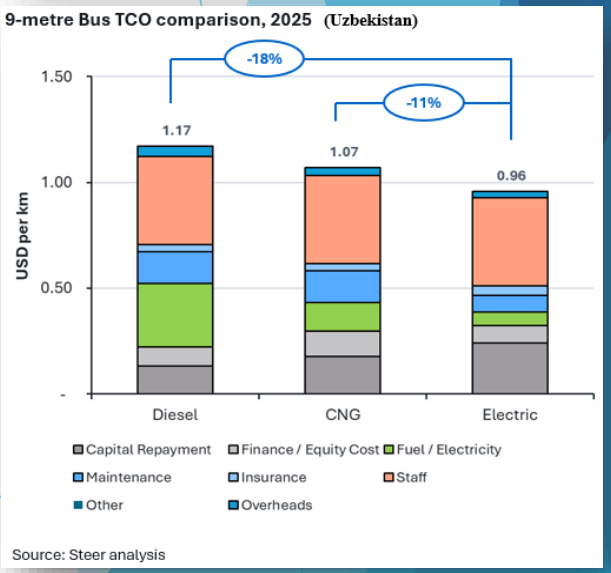
- **E-Mobility in fleet applications lowers lifecycle costs, resulting in financial gains for operators**

- Vehicles like electric buses, taxis, and delivery vehicles that run high daily kms have lower lifecycle costs in many markets, resulting in direct economic benefits.









Accelerating adoption of e-buses can significantly improve air quality while lowering cost of public transportation in Central Asia

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Thank you!