Enhancing the connectivity, sustainability, and resilience of regional freight transport in Central Asia

Summary of study results

ITF / MLIT Policy Dialogue

5 September 2025

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The motivation for studying regional freight transport in Central Asia

Infrastructure alone will not deliver sustainable growth

Policy gaps are hindering sustainable connectivity

Freight transport faces structural and environmental challenges

New approach: aligning connectivity with decarbonisation and resilience

Introducing the three pillars of freight transport

Connectivity

The efficiency and integration of infrastructure, services, and institutional frameworks that enable the seamless movement of goods across transport networks and borders.

It encompasses:

- Physical connectivity
- Institutional connectivity
- Market connectivity

Decarbonisation

The reduction of greenhouse gas (GHG) emissions across logistics and supply chains while maintaining reliability and cost-effectiveness.

Key strategies include:

- Operational efficiency
- Low-carbon transport modes and fuels
- Sustainable infrastructure
- Policy and market incentives

Resilience

The ability of supply chains and logistics networks to withstand, adapt to, and recover from disruptions while maintaining efficient goods movement.

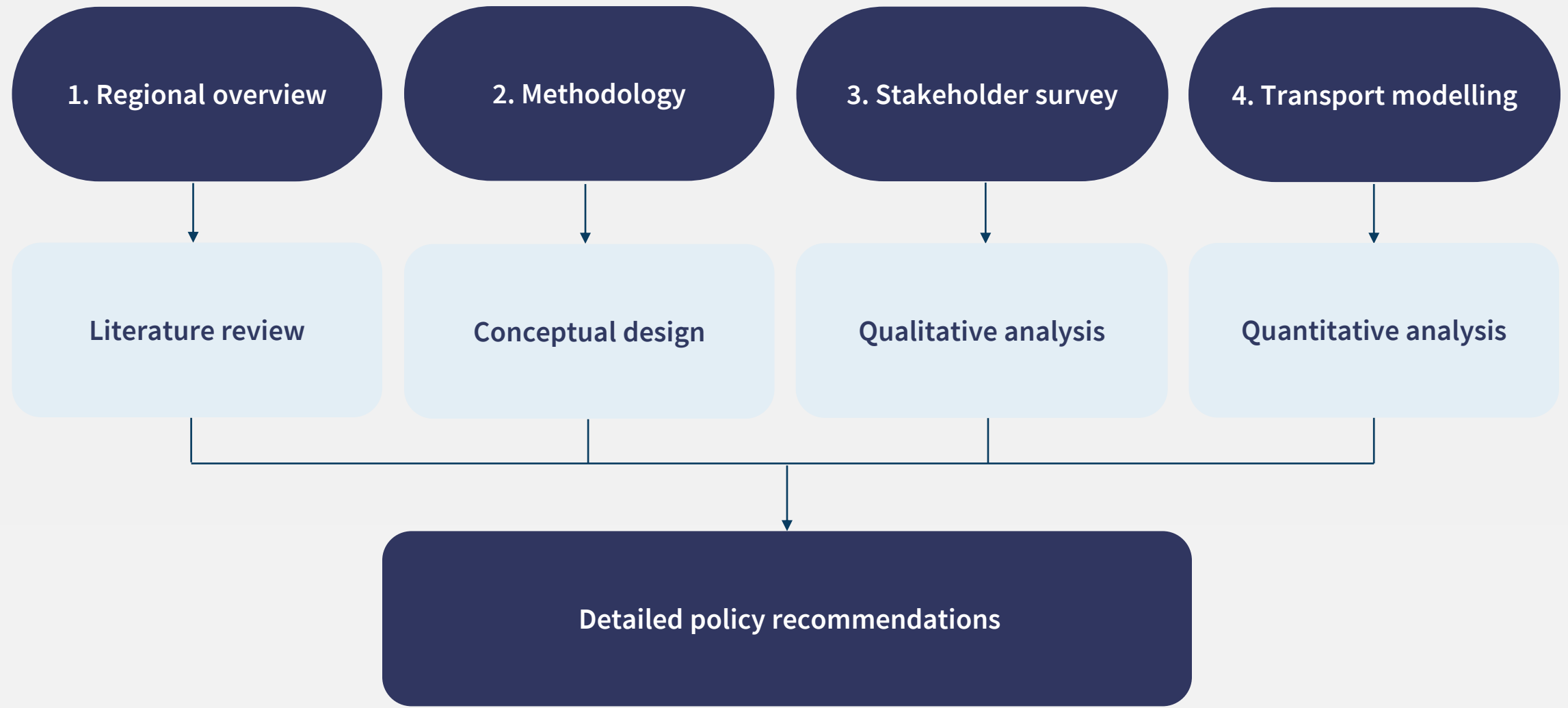Key dimensions include:

- Infrastructure resilience
- Network resilience
- Operational resilience
- Organisational resilience

How do connectivity, decarbonisation, and resilience relate to one another?
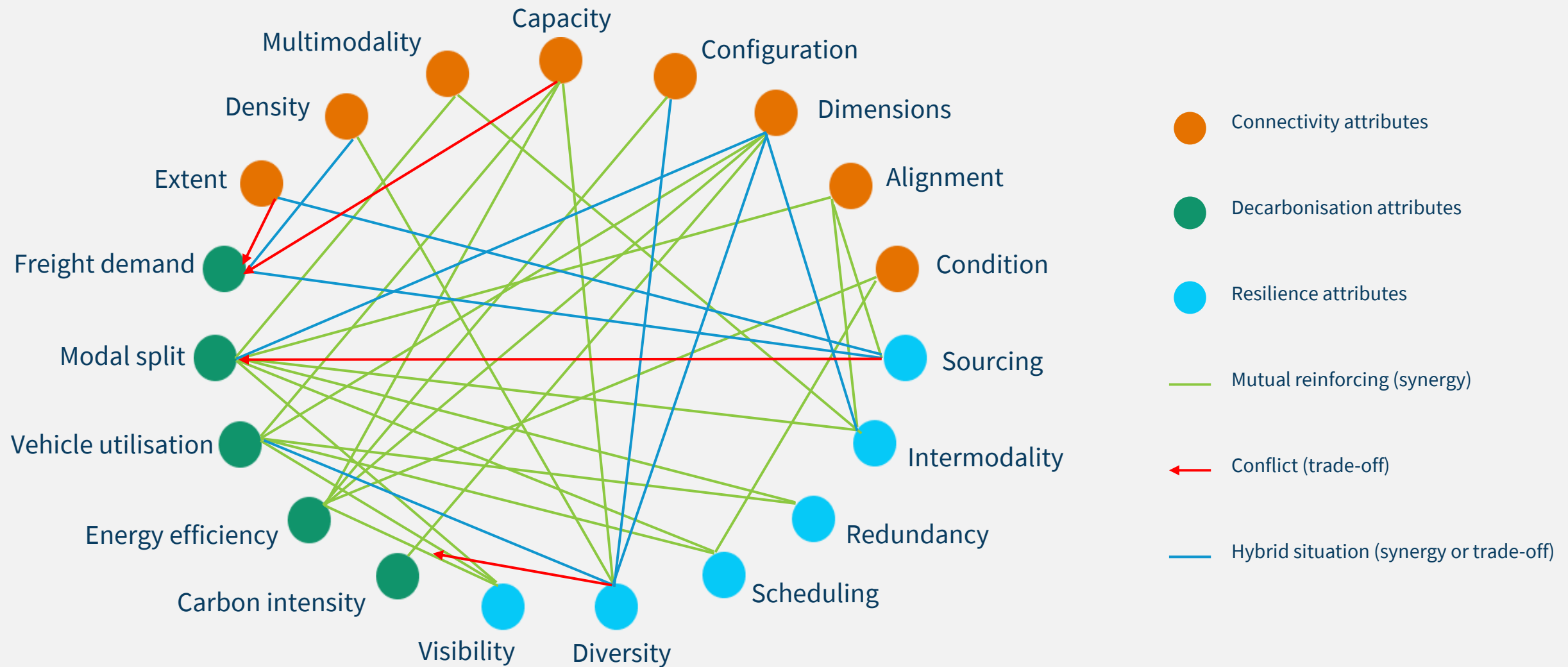
Key analytical components of the study

Methodology paper series

Describes the three pillars (connectivity, decarbonisation and resilience), and the interconnections between them.

- Conceptual frameworks
- Empirical insights
- Analytical tools
- Regional applications
- Selection of policy measures

Available via the ITF repository:

https://www.itf-oecd.org/repository/sipa-enhancing-regional-freight-connectivity

Accompanied by the ITF Academic Lecture Series:

Available via the ITF YouTube Channel

Stakeholder survey structure and methodology

- 22 questions (multiple choice and open-ended)
- Focus on connectivity, sustainability, resilience, and freight planning
- Regional common trends
- Country analysis
- Sectoral analysis
- Current vs desired policies

Number of respondents by sector

Sector	Value
Public	81
SOE	218
Private	184
Other	54
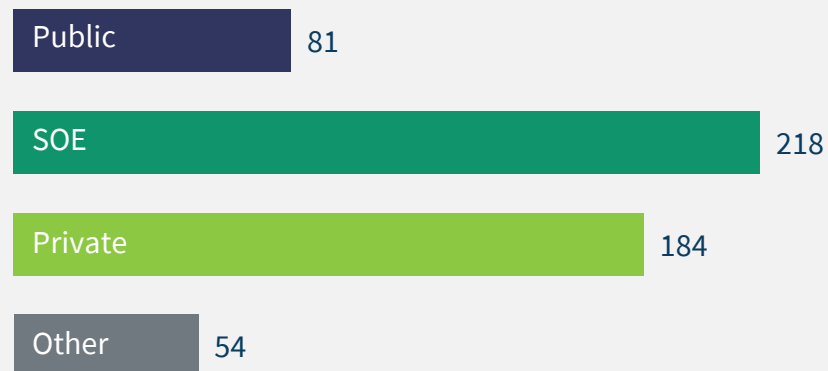
Number of respondents by country

Kazakhstan (209)

Uzbekistan (86)

Kyrgyzstan (104)

Tajikistan (25)

Mongolia (113)
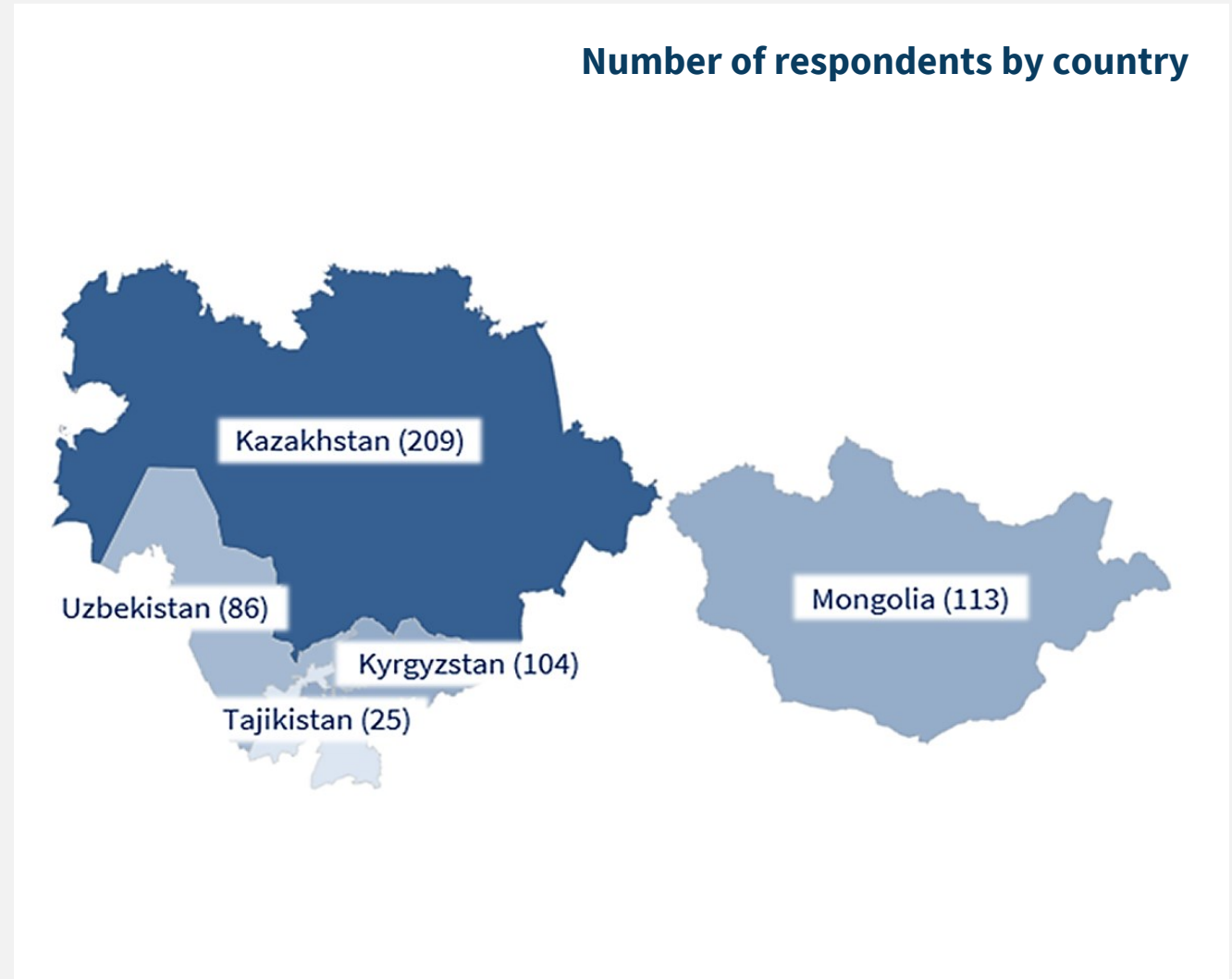
Survey example: expert perspectives on freight connectivity policies

Major freight transport bottlenecks in the region

Share of respondents

- Connectivity
- Road
- Rail
- Operations and maintenance
- Capacity and access limits
- Maritime

■ Regional average
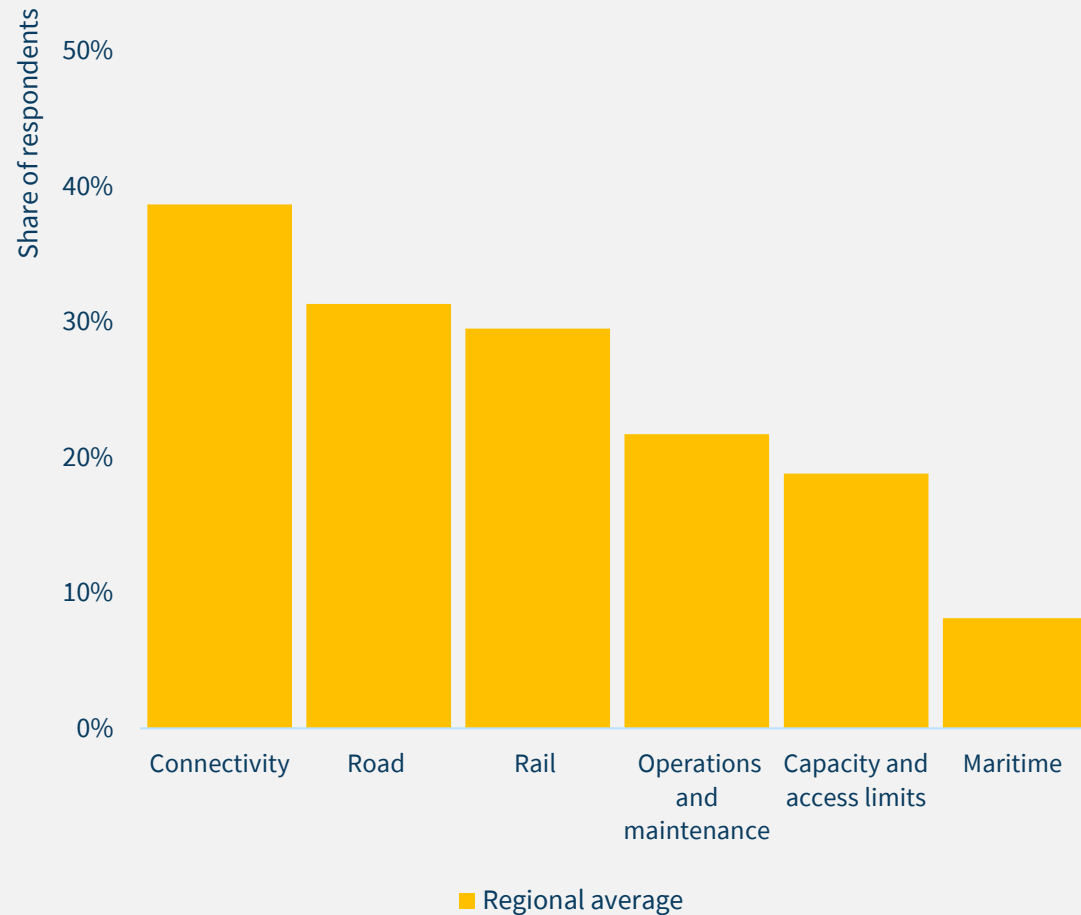
Current and desired freight connectivity policies

Share of respondents

- Reducing intermodal and border delays
- Road expansion
- Rail expansion
- Digitilisation and optimisation
- Increasing asset utilisition
- Maritime expansion

■ Current   ■ Desired
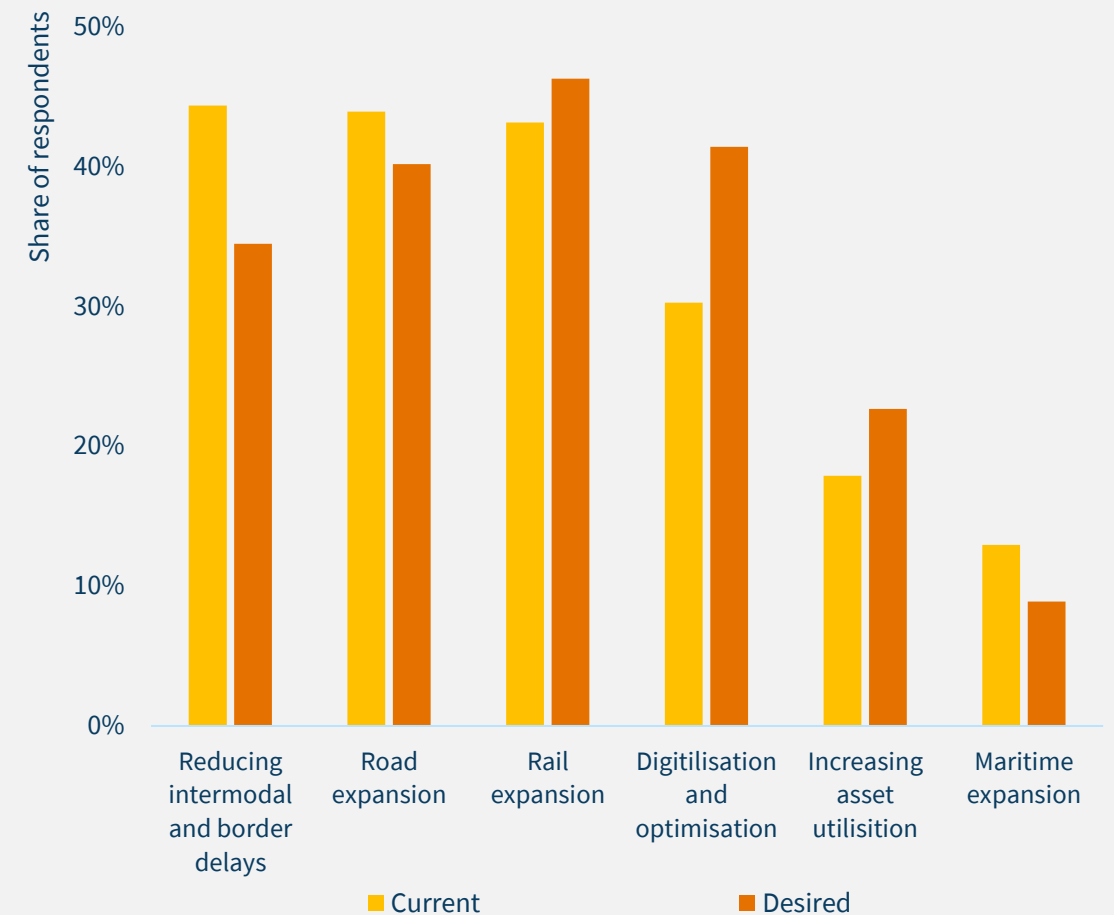
Survey example: policymaking bottlenecks and capacity challenges

Major bottlenecks in freight transport policymaking

Share of respondents

Categories: Budgeting, Legislative approval, Draft legislation, Prioritisation, Public consultation, ex ante evaluation, Implementation plan, ex post evaluation, Conceptualisation, Finding contractors

■ Regional average
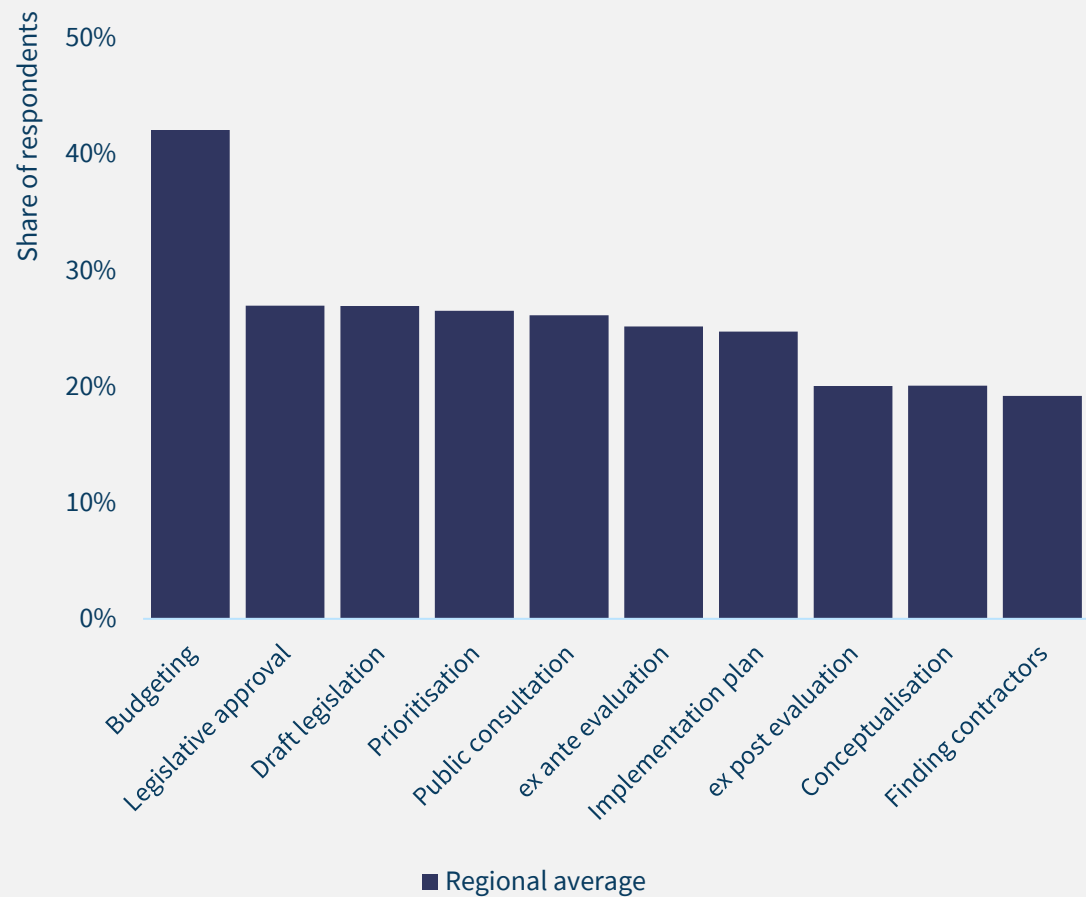
Capacity challenges in evaluating investments

Share of respondents

Categories: Limited funding, Limited staff resources, Limited technical expertise, Data availability, Lack of a strategic vision, Shifting political priorities

■ Regional average
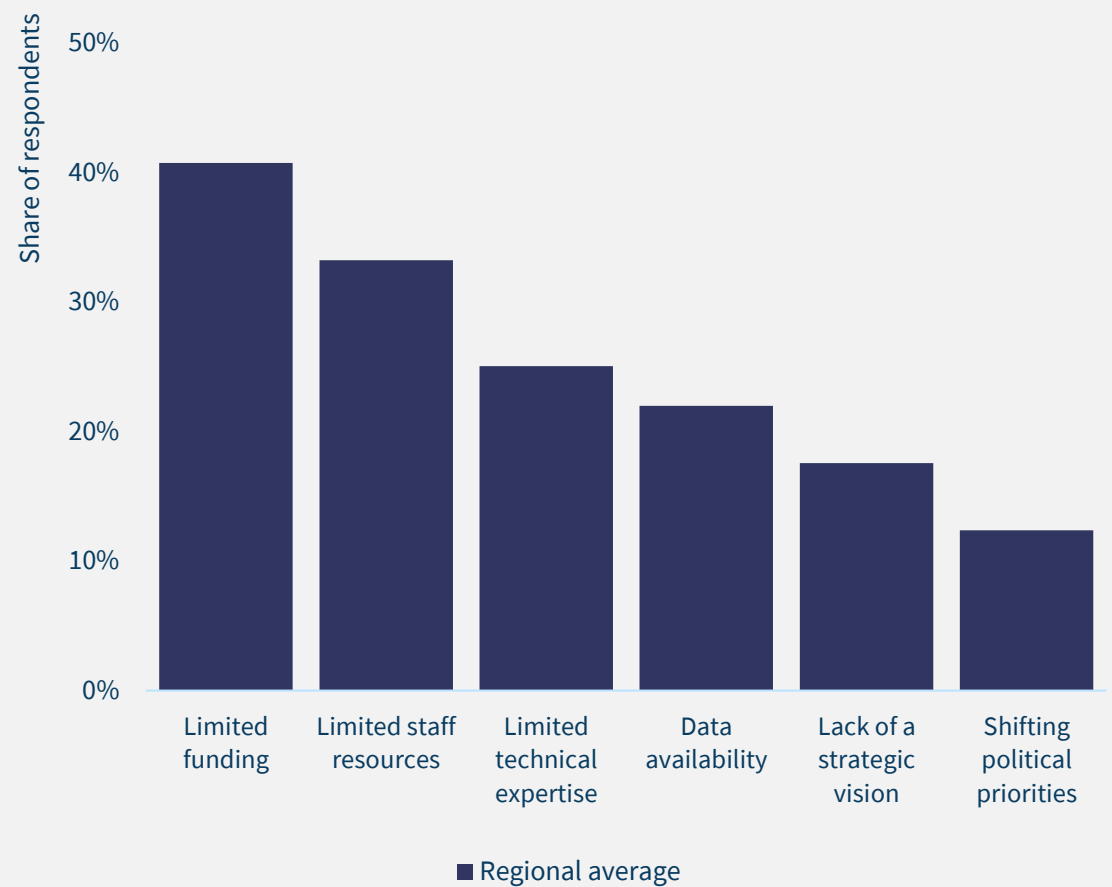
Transport modelling: policy scenarios considered in this study

BAU

Business-as-Usual: A baseline scenario that reflects the expected evolution of policies and infrastructure, including only officially approved measures and projects with secured financing, used as a reference point for comparison.

HA-C

High ambition - Connectivity: A scenario that builds on BAU with accelerated infrastructure development, stronger cross-border coordination, and measures to improve multimodal integration, border procedures, and logistics performance.

HA-CD

High ambition – Connectivity and Decarbonisation: A scenario that extends HA-C, aiming to cut emissions through cleaner technologies, greener modes, efficient logistics, and regulatory, technological, and decarbonisation market measures.
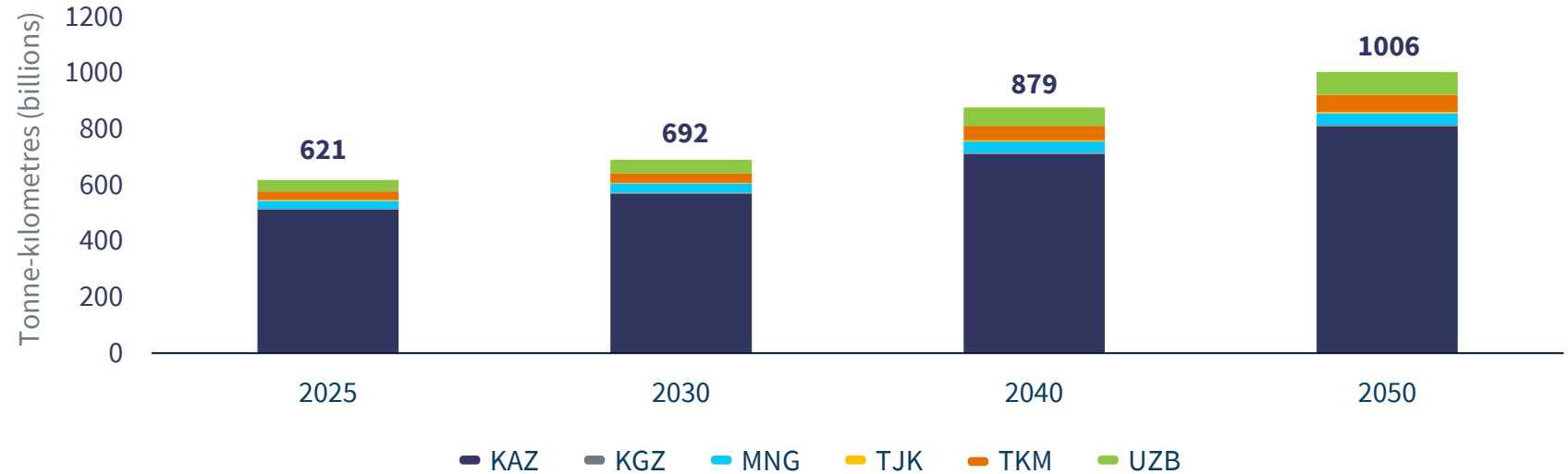
Resilience Case Study

An assessment of how climate and geophysical shocks on key national corridors affect freight costs under different policy scenarios.

It illustrates how connectivity and decarbonisation measures can amplify or reduce the impacts of disruptions.
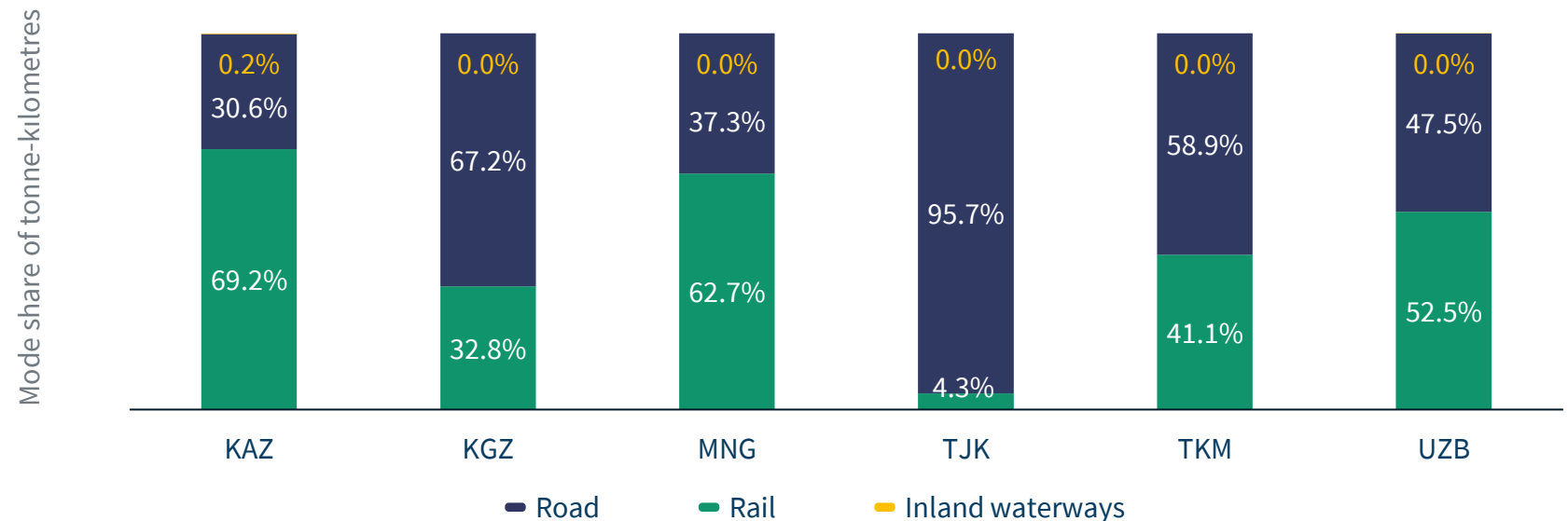
Baseline transport demand projections

- **Freight demand is set to rise sharply**, with Kazakhstan remaining the dominant hub in regional traffic.

- **Modal splits are diverging**, as some countries build balanced rail–road systems while others remain heavily road-dependent.

- **Closing infrastructure gaps will shape competitiveness**, as countries with limited rail capacity risk higher costs and lower resilience.

Surface transport demand by country

Tonne-kilometres (billions)

621 — 2025
692 — 2030
879 — 2040
1006 — 2050

Legend: KAZ, KGZ, MNG, TJK, TKM, UZB

Surface transport mode share in 2050 by country

Mode share of tonne-kilometres

Country	Road	Rail	Inland waterways
KAZ	30.6%	69.2%	0.2%
KGZ	67.2%	32.8%	0.0%
MNG	37.3%	62.7%	0.0%
TJK	95.7%	4.3%	0.0%
TKM	58.9%	41.1%	0.0%
UZB	47.5%	52.5%	0.0%

Legend: Road, Rail, Inland waterways

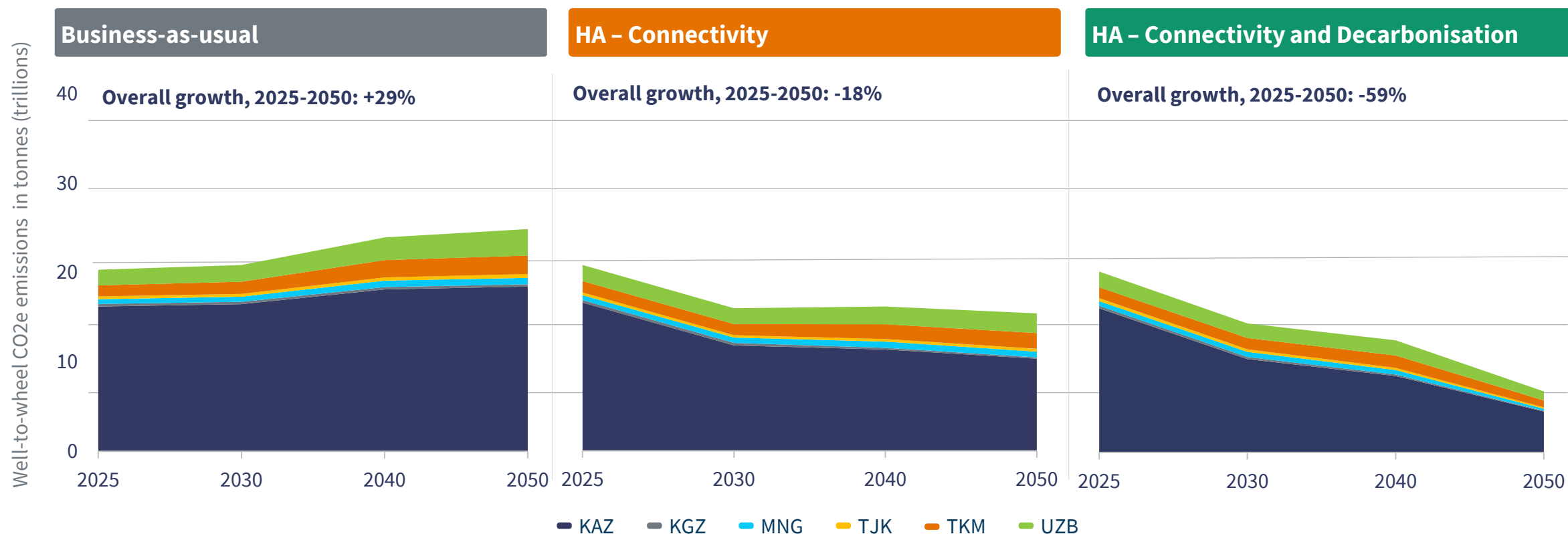# Connectivity indicator: improving access to markets

- **High transport costs limit global competitiveness**, with Central Asia facing much higher access costs than leading economies today.

- **Ambitious policy scenarios reduce costs significantly**, showing how coordinated strategies can close gaps and rebalance regional performance.

- **Efficiency gains matter as much as infrastructure**, as cost reductions depend on pairing investments with reforms such as digitalisation.

Average transport cost to reach 60% of global GDP

Project countries | Global benchmarks

Chart: Transport cost in USD per tonne (y-axis 0–600) for KAZ, KGZ, MNG, TJK, TKM, UZB, CA (Project countries) and CHN, DEU, JPN, USA (Global benchmarks), with series BAU – 2025, BAU – 2050, HA-C – 2050, HA-CD – 2050.

Legend: ■ BAU - 2025 ■ BAU - 2050 ■ HA-C - 2050 ■ HA-CD - 2050
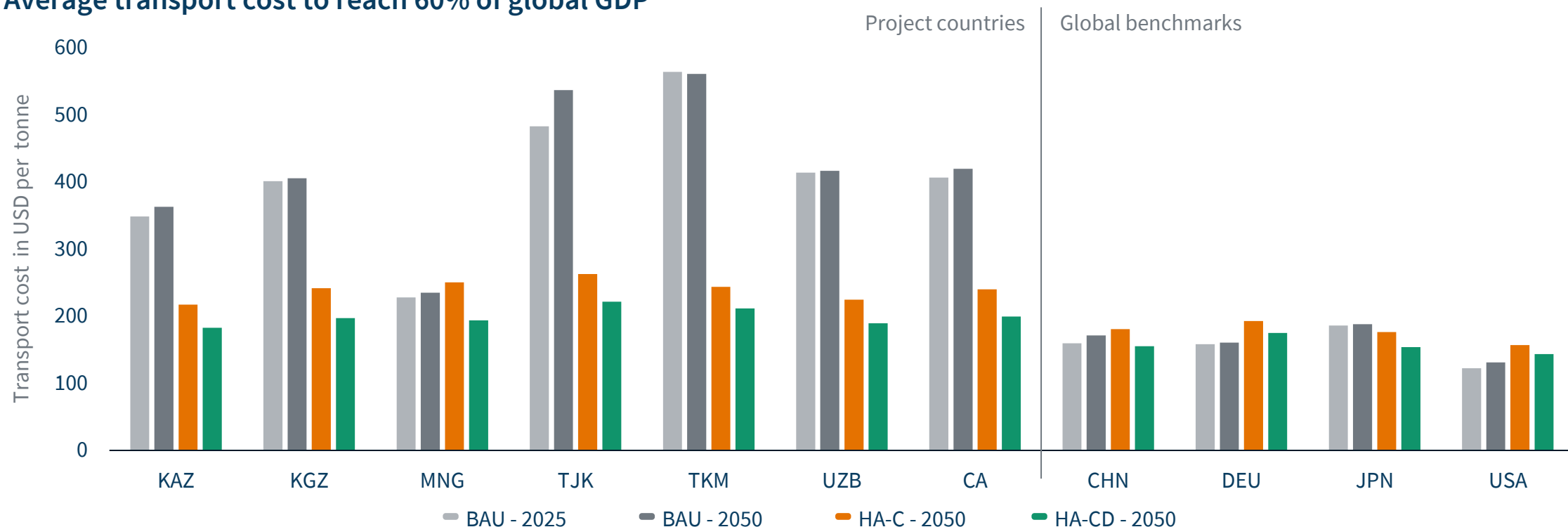
Decarbonisation indicator: mitigating carbon emissions

- **Business-as-usual locks in rising freight emissions**, showing the limits of current practices without major efficiency or energy shifts.

- **Connectivity-focused measures curb emissions growth**, proving that operational efficiency and smarter asset use can deliver reductions.

- **Only integrated decarbonisation strategies** with clean fuels, electrification, and modal shift align freight transport with climate goals.

Business-as-usual

HA – Connectivity

HA – Connectivity and Decarbonisation

Well-to-wheel CO2e emissions in tonnes (trillions)

Overall growth, 2025-2050: +29%

Overall growth, 2025-2050: -18%

Overall growth, 2025-2050: -59%

KAZ ● KGZ ● MNG ● TJK ● TKM ● UZB

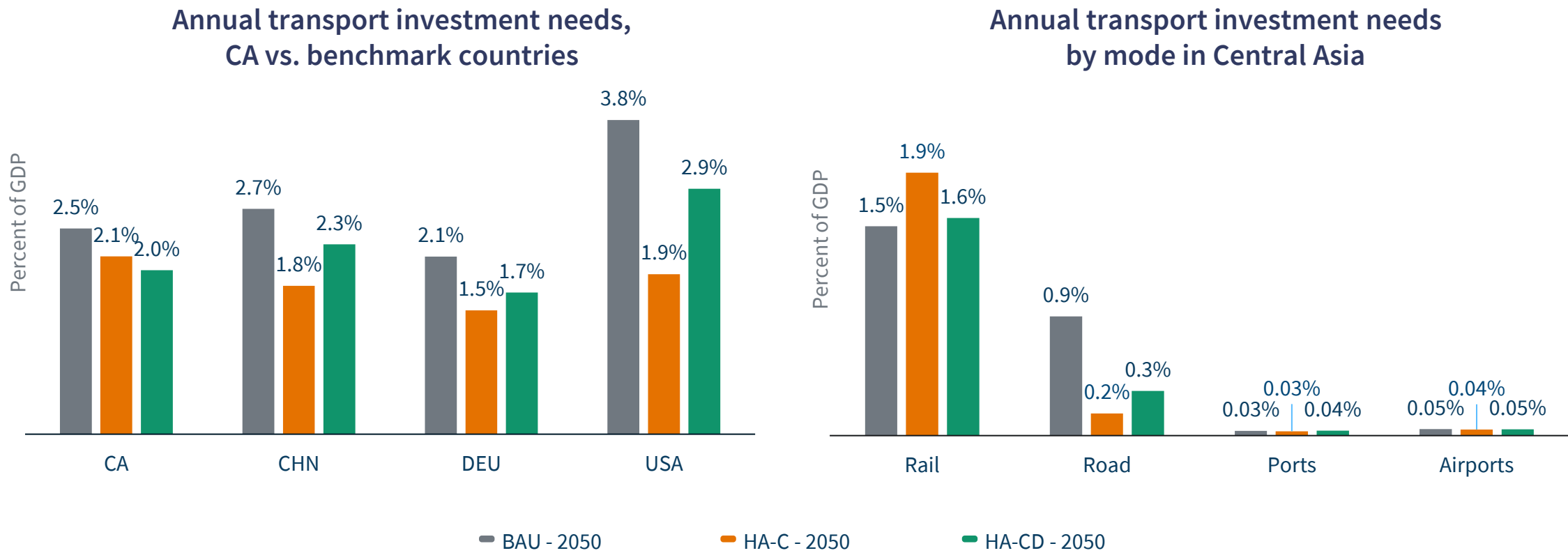# Resilience indicator: enhancing flexibility through intermodality

- **Intermodal growth signals a shift** in Central Asia's freight operations from legacy single-mode systems toward more flexible and efficient networks.

- **Diverging futures emerge by 2050**: Kazakhstan and Turkmenistan expand intermodality as a way to decarbonise, while others lean on optimised single-mode corridors.

- **Balancing efficiency and resilience** is critical, as higher reliance on single modes may reduce adaptability despite gains in cost and emissions performance.

Share of international freight crossing intermodal boundaries

Project countries | Global benchmarks

Percent of International tonnes

	BAU - 2050	HA-C - 2050	HA-CD - 2050
KAZ	24%	31%	35%
KGZ	10%	24%	15%
MNG	9%	11%	13%
TJK	15%	28%	18%
TKM	18%	37%	38%
UZB	11%	22%	14%
CHN	63%	93%	72%
DEU	33%	45%	41%

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Investments needed for each scenario

- **High Ambition scenarios lower costs**, reducing transport investment needs thanks to efficiency gains and demand shifts.

- **Rail absorbs the largest share of investment** while road needs decline sharply, showing how modal rebalancing avoids costly expansion.

- **Cost efficiency improves with decarbonisation**, as HA-CD brings regional needs below benchmarks like China and the USA.

Annual transport investment needs, CA vs. benchmark countries

Percent of GDP

CA	CHN	DEU	USA
2.5% / 2.1% / 2.0%	2.7% / 1.8% / 2.3%	2.1% / 1.5% / 1.7%	3.8% / 1.9% / 2.9%

Annual transport investment needs by mode in Central Asia

Percent of GDP

Rail	Road	Ports	Airports
1.5% / 1.9% / 1.6%	0.9% / 0.2% / 0.3%	0.03% / 0.03% / 0.04%	0.05% / 0.04% / 0.05%

■ BAU - 2050   ■ HA-C - 2050   ■ HA-CD - 2050

Highlighted policy recommendations: regional level

Enhancing regional connectivity

- **Promote a shift to rail** through investment in cross-border corridors with sufficient capacity.
- **Develop dry ports and logistics centres** to strengthen intermodal connectivity across the region.
- **Advance digital platforms** to improve cargo tracking, streamline border procedures, and reduce delays.
- **Harmonise regulations and engage the private sector** to cut transport costs and enhance logistics performance.

Accelerating decarbonisation

- Increase rail's freight share and **expand electrification** to cut emissions across key corridors.
- **Promote fuel efficiency standards** and green freight incentives as cost-effective climate measures.
- **Improve operational efficiency** through digital platforms and smart route planning.
- **Support sustainable transition with fiscal tools** like carbon pricing, distance-based charges, and targeted tax incentives.

Strengthening resilience

- **Enhance the capacity and diversity** of both road and rail links through integrated multimodal networks to build redundancy.
- Upgrade freight infrastructure and **apply climate-resilient design standards** to reduce physical vulnerabilities.
- **Improve crisis preparedness** through emergency logistics planning and real-time monitoring systems.
- **Strengthen regional co-ordination** on data sharing and risk management to better respond to disruptions.

Highlighted policy recommendations: country level

Kazakhstan

- **Upgrade Aktau and Kuryk ports** to handle the projected sixfold increase in throughput by 2050.
- **Modernise and electrify key rail routes**, resolve bottlenecks with targeted upgrades to bring rail's modal share above 80%.
- **Develop the Digital Trade Corridor** with e-declaration, smart warehousing, and digital platforms.
- **Optimise freight asset utilisation** by reducing empty runs on key corridors like Dostyk–Aktau.

Mongolia

- **Upgrade road and rail links with neighbours** and develop dry ports and inland hubs to meet 134% freight growth.
- **Expand the transport network beyond primary transit corridors** to provincial production and consumption centres.
- **Enhance customs with automation**, digital platforms, and predictive freight tools to cut clearance times.
- **Combine decarbonisation improvements with resilience investments** to address Mongolia's rising freight costs.

Uzbekistan

- **Upgrade key rail corridors and intermodal links** to cut high freight costs and support modal shift to rail.
- **Promote cleaner freight** with fuel standards, electric/CNG trucks, and green corridors like Tashkent–Samarkand.
- **Expand logistics hubs** in Navoi, Tashkent, and Andijan, and enhance resilience with digital tools and disaster systems.
- **Advance e-TIR, e-CMR, and AI-driven planning**, and attract private investment in smart logistics and cold chains.

Thank you

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Study materials:

Link to project webpage

Link to project deliverables

Link to SIPA-T webpage