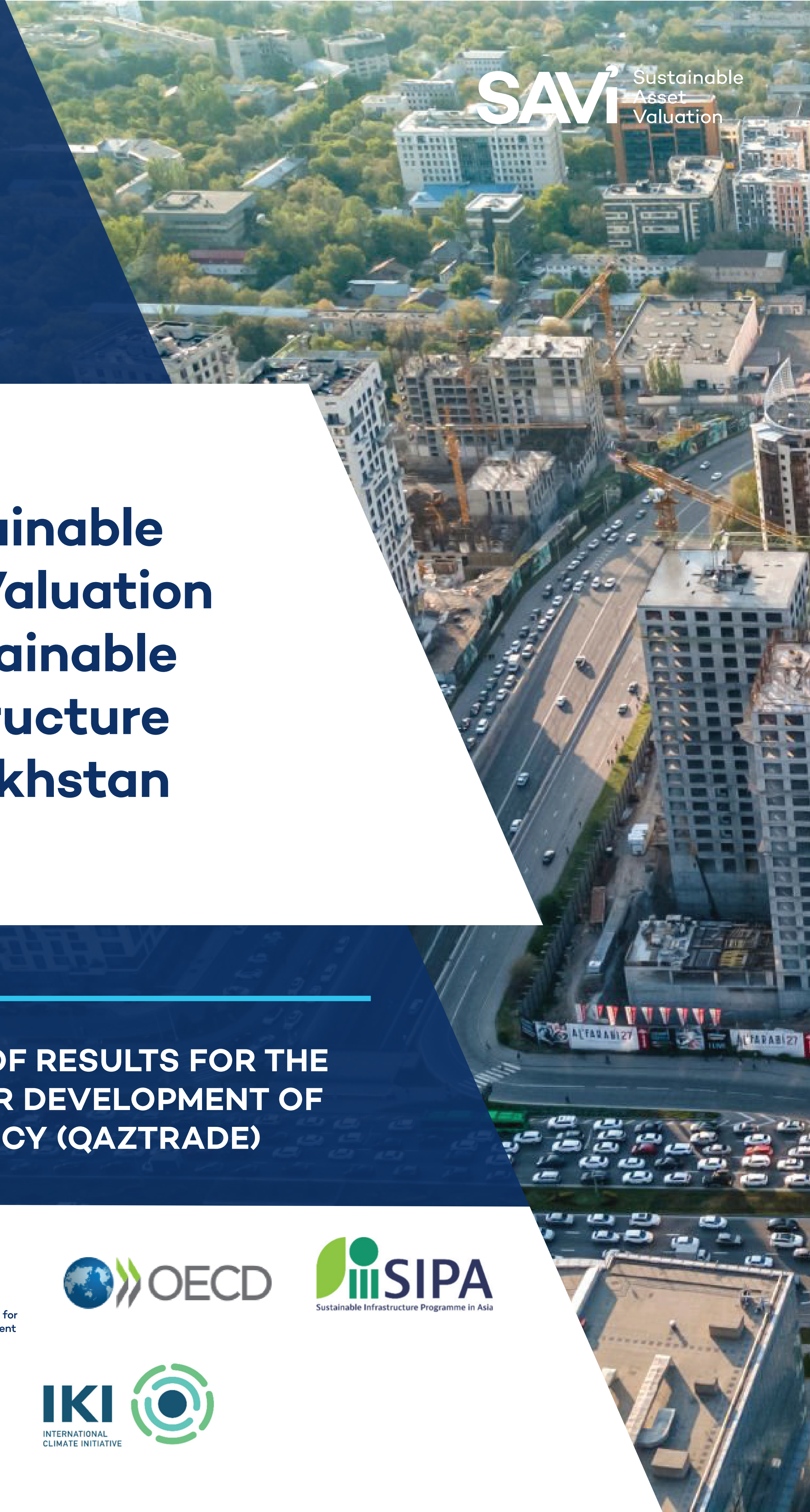
SAVI Sustainable Asset Valuation



A Sustainable Asset Valuation of Sustainable Infrastructure in Kazakhstan

SUMMARY OF RESULTS FOR THE CENTER FOR DEVELOPMENT OF TRADE POLICY (QAZTRADE)

IISD International Institute for Sustainable Development

OECD

SIPA Sustainable Infrastructure Programme in Asia

On behalf of:

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

of the Federal Republic of Germany

IKI International Climate Initiative

A Sustainable Asset Valuation of Sustainable Infrastructure in Kazakhstan

Kazakhstan and Uzbekistan aim to promote close and mutually beneficial trade relationships along the Shymkent–Tashkent–Khujand economic corridor. To help achieve this, feasibility studies were developed regarding the creation of an International Center for Trade and Economic Cooperation Central Asia between the two countries, as well as a trade and logistics centre. These investments—including for transport and building infrastructure—aim to create jobs, increase trade and investment from the private sector, and foster economic cooperation, including in the tourism sector. In addition, the project aims to include a modern and more efficient border crossing point and procedures for cross-border movement of people, vehicles, and goods.

We carried out a Sustainable Asset Valuation (SAVi) of sustainable transport and building infrastructure options for the trade corridor in collaboration with the Ministry of Trade and Integration and the Center for Development of Trade Policy (QazTrade).

The main objectives of the integrated assessment are to provide knowledge and raise awareness on the impact of sustainable infrastructure on the efficiency of trade, energy efficiency and energy use, congestion, commuting times and number of accidents on the roads, CO_2 emissions, and employment creation.

This note summarizes the results of the SAVi assessment. A methodological note is available with more information about the indicators, scenarios, and data assumptions.

This summary combines the sustainable transport and buildings assessments to recommend the following:

- the expansion and strengthening of a railway as a sustainable transport option (green infrastructure) because it has significant advantages, such as faster transport of materials, greater cargo capacity, cleaner energy use (when electrified with renewable energy), reduced maintenance costs of roads, reduced congestion, and reduced number of accidents.
- the construction of sustainable buildings and/or retrofitting of conventional buildings, designed to have a more efficient use of energy and use clean energy sources for lighting, cooking, heating, and cooling, which will reduce greenhouse gas (GHG) emissions, the risk of carbon pricing, and impacts associated to air pollution (e.g., health impacts). Sustainable buildings will also use less water and have more sustainable waste management (recycling and reuse).

The SAVi methodology provides policy-makers and investors with a comprehensive analysis of the costs and benefits of an infrastructure project or policy intervention throughout its life cycle. We consider a wide range of economic, social, and environmental risks and impacts that are typically overlooked in traditional valuations, looking below the surface for the broader knock-on effects of implementing a transport project. More details on the methodology used for this assessment can be found in the methodology note published jointly with this summary.

The results of the sustainable infrastructure scenario were discounted using two different discount rates: 11.8% for all tangible impacts based on current 10-year government bond yields in Kazakhstan and 3.5% for all social and environmental intangible impacts as per *UK Green Book* guidance.[1] The total projected discounted investment costs for the sustainable infrastructure project, which combines capital and operation and maintenance (O&M) costs for both the railway and renewable energy for buildings, amount to KZT 321 billion (USD 698 million).

Overall, the sustainable infrastructure scenario in Kazakhstan would generate a cumulative discounted net benefit of KZT 2,424 billion (USD 5,259 million), considering a project period of 28 years from 2022 to 2050. When accounting for the full range of benefits of the sustainable infrastructure scenario, the results show an integrated benefit-to-cost ratio of 8.53 per USD invested.[2]

In addition, the sustainable infrastructure scenario will produce significant economic benefits for Kazakhstan, such as value added from freight trade, revenues from freight trade, time savings, income creation from employment from both the railway and power generation, as well as avoided costs of CO_2 emissions, traffic accidents, energy costs, and fuel use.

The greatest impact of the sustainable infrastructure is the added benefit from the value added from freight trade, which looks at the wider economic benefits of freight trade and amounts to a cumulative discounted benefit of KZT 2,452 billion (USD 5,319 million) over the project period. The value added from freight trade assumes a 60% shift from road to rail transport and considers the economic value of goods transported, the most valuable of which is uranium. It is valued at USD 110/kg, and a 5% profit margin is assumed. The value added from freight trade is differentiated from revenues from freight trade which considers solely the revenues from transporting goods by rail and road and makes up the second greatest impact, valued at KZT 264 billion (USD 574 million). Time savings also represent a big impact in the sustainable infrastructure scenario, amounting to a cumulative, discounted value of KZT 18 billion (USD 40 million), followed by income creation from railway employment, which stands at a cumulative KZT 7.5 billion (USD 16 million). The highest avoided costs come from the avoided CO_2 emissions from road transport replaced by rail, which delivers cumulative discounted benefits of KZT 1.5 billion (USD 3.3 million) over the project period, as well as the avoided costs of fuel use and traffic accidents. For the calculation of CO_2 emissions, we are using the cost of carbon, which amounts to USD 31 per ton of CO_2 emissions. If the cost of carbon was doubled, then avoided CO_2 emissions from road transport in the sustainable infrastructure scenario would be USD 6.5 million. If the required energy for both the railway and the buildings was generated by coal and not renewable energy sources, CO_2 emissions would be additional and not avoided. More specifically, the cumulative additional CO_2 emissions for energy generated by coal, over the project period, would amount to USD 6.7 million (using the shadow price of USD 31 per ton of CO_2 emissions).

---

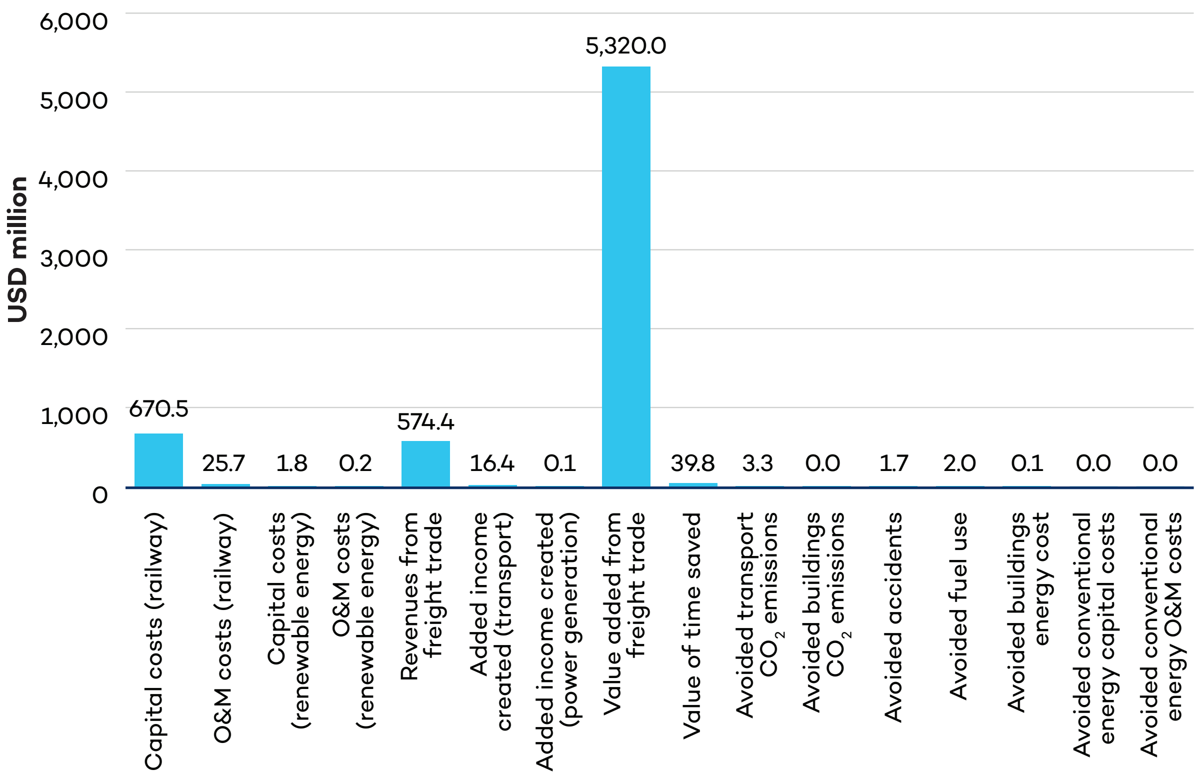
1 The *Green Book* is the British government's guidance on appraisal and evaluation of policies, programs, and projects. It can be found at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1063330/Green_Book_2022.pdf

2 If capital costs are 25% lower than the amount considered (USD 2.5 million per km), then the benefit-cost ratio will increase to a larger value, possible above 20. This is because capital costs are accrued early in the project timeline, whereas benefits are discounted over time.

The levelized capital cost of renewable energy-based power generation for the railway and the buildings differs from the levelized capital cost of fossil fuel-based power generation. Specifically, the levelized cost of power generation shows that solar power is cheaper than fossil fuel in terms of power generation. The cost per MWh ranges from USD 24 to USD 96 for solar power and USD 39 to USD 101 for gas. The same applies to the marginal capital cost, with solar power becoming cheaper than thermal power generation capacity over time, and before 2030.

Overall, the project will increase trade efficiency and connectivity between Kazakhstan and Uzbekistan by reducing supply bottlenecks at the border and speeding up administrative processes, both of which will facilitate larger volumes being traded and lower economic losses. As a result of increased trade efficiency, businesses and farmers, including many women, will have improved access to markets.

Figure 1. Monetary values of investment costs, revenues, added benefits, and avoided costs of sustainable infrastructure in Kazakhstan



Source: Authors.

Integrated valuations, such as the SAVi assessment, provide a fuller picture of the long-term effects of infrastructure projects by integrating these values into the traditional calculations of benefit-to-cost (BCR) ratios. A traditional BCR for this project considering only the tangible impacts (e.g., capital and O&M costs for the railway and power generation, revenues from freight trade) amounts to 0.82 for every USD invested. This would, therefore, not be considered an investment-worthy project by traditional standards.

However, the sustainable benefit-cost ratio (S-BCR), which considers the project from a societal point of view and is based on the estimation of the full range of economic, social, and environmental added benefits and avoided costs, is 8.53, demonstrating the considerable value the proposed highway project would bring from a socioeconomic perspective.

Table 1. Results of the SAVi assessment of sustainable infrastructure in Kazakhstan

Net results

Scenario	Unit	Sustainable infrastructure (transport and buildings)
Cumulative net benefits (undiscounted)	KZT billion	52,717
Cumulative net benefits (discounted)	KZT billion	2,424
Cumulative net benefits (discounted)	USD million	5,259
BCR		0.82
S-BCR		**8.53**

Source: Authors.

The SAVi assessment demonstrates that advancing sustainable infrastructure investment options in the transport and buildings sector in Kazakhstan requires identifying, assessing, and valuing these societal benefits and avoided costs so that city planners and project developers can advocate for their implementation and financing. The outlining of the project-specific benefits of these projects and the identification of the sustainable infrastructure scenario were done in collaboration with the Ministry of Trade of Kazakhstan.

It is critical that policy-makers design and implement processes to recognize and account for these wider benefits so that decisions are made in favour of transport investments that provide the greatest benefits to society while minimizing their environmental impacts.

About SIPA

The Sustainable Infrastructure Programme in Asia (SIPA) is funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety under its International Climate Initiative. SIPA is implemented by the Organisation for Economic Co-operation and Development and international partners. It aims to help selected Central and Southeast Asian countries scale up energy, transport, and industry infrastructure investments and shift them toward infrastructure projects consistent with low-emission, resilient development pathways and the Sustainable Development Goals.

Why Use SAVi?

SAVi calculates the environmental, social, and economic risks and externalities that impact the financial performance of infrastructure projects. These variables are typically ignored in traditional financial analyses.

SAVi is a simulation tool that is customized to individual infrastructure projects. It is built on project finance and systems dynamics simulation.

Visit the SAVi webpage: iisd.org/savi

About SAVi

SAVi is a simulation service that helps governments and investors value the risks and externalities that affect the performance of infrastructure projects.

The distinctive features of SAVi are:

- Valuation: SAVi values, in financial terms, the material environmental, social, and economic risks and externalities of infrastructure projects. These variables are ignored in traditional financial analyses.
- Simulation: SAVi combines the results of systems thinking and system dynamics simulation with project finance modelling. We engage with asset owners to identify the risks material to their infrastructure projects and then design appropriate simulation scenarios.
- Customization: SAVi is customized to individual infrastructure projects.

iisd.org/savi

SAVi Sustainable Asset Valuation