

CLIMATE CHANGE ASSESSMENT

I. BASIC PROJECT INFORMATION

Project Title:	Central Asia Regional Economic Cooperation Corridor 2 (Pap–Namangan–Andijan) Railway Electrification Project – Additional Financing
Project Cost (\$ million):	
Location:	Fergana Valley, Uzbekistan
Sector:	Transport (Rail Transport [nonurban])
Theme:	Climate mitigation and adaptation
Brief Description:	<p>The project will complete the modernization of the railway network that links Tashkent city, the nation's capital, with the major cities and towns in the populous Fergana Valley located to the south-east. It directly complements (i) work being undertaken under the current project to electrify and modernize the Pap–Namangan–Andijan railway section in the Fergana Valley, and (ii) the work completed by the government and the O'zbekiston Temir Yo'llari, with assistance from the People's Republic of China and the World Bank, to construct the Angren – Pap railway through the Kamchik Pass.</p> <p>The project components consist of (i) construction of two traction substations, linked to supervisory control and data acquisition, (ii) construction of two section posts, (iii) upgrading of transformers on two existing traction substations, (iv) installation of signaling and telecommunication systems, (v) installation of a video surveillance system, and (vi) the commissioning of machinery and equipment for electrified line maintenance.</p> <p>The increasing temperature may impact on sustainability of traction substations and section posts during operation. Increased number of avalanches and mudflows in mountain areas may create a risk for train movement.</p>

Source: Asian Development Bank.

II. SUMMARY OF CLIMATE CHANGE FINANCE

Project Financing		Climate Finance ^a	
Source	Amount (\$ million)	Adaptation (\$ million)	Mitigation (\$ million)
Asian Development Bank			
Ordinary capital resources (regular loan)	121.0	1.1	119.9
Government of Uzbekistan/O'zbekiston Temir Yo'llari	43.0	0.0	43.0
Total	164.0	1.1	162.9

Source: Asian Development Bank.

III. SUMMARY OF CLIMATE RISK SCREENING AND ASSESSMENT

A. Sensitivity of Project Components to Climate or Weather Conditions and the Sea Level

According to Uzbekistan's Third National Communication on Climate Change, Fergana Valley (especially Ferghana and Andijan provinces) and Tashkent province is categorized as an area with low susceptibility to climate change. Nevertheless, some changes in temperature, annual precipitation distribution, extreme temperatures are anticipated in the project area due to climate change. Average annual temperature will increase on the territory of Ferghana valley by 1.2 °C to 1.4 °C by 2040. For this assessment, the period from 1980 to 1999 was adopted as the baseline period¹. The annual fluctuation of precipitation will not change significantly and may increase compared with the baseline year (2010) by 1% to 4% over the period 2021-2040. Intra-annual variation of temperature will lead to some increase in temperature during the night and substantial growth of temperature during the day time, especially in the time of heat waves (number of days with temperature exceeding +40 °C). It is anticipated that the number of days with temperature +40 °C in Ferghana valley will increase from the current 5 days per year to 10 to 20 days per year by 2050 for Moderate Greenhouse Gases Emission Scenario WRE750.² The distribution of precipitation during the year will increase during the wintertime and decrease during the summer. Increasing precipitation's amount during the wintertime and intensity of snowmelt will increase the number of mudflows, which are a particular risk in the Ferghana Valley.

Risk of avalanche risk may decrease by 20 to 30% in the period 2030-2050 in comparison with the period of 2000-2015. However, with the general trend towards decrease in avalanche activities, in extremely snowy winters threat of avalanching occurrence will remain very high. This is especially distinctive for the upstream reaches of Akhangaran river. It should be noted that in view of intensive population growth, expansion of economic activities, development of tourism and recreation zones in perspective up to 2050, avalanche risks remain. This indicates necessity for systematic observations and adoption of preventive measures.³

Project components which are vulnerable to climate change.

1. Construction of two Traction Substations
2. Installation of SCADA, signaling and telecom systems
3. Upgrading of transformers in 4 existing traction substations

B. Climate Risk Screening

The project siting is on existing railway alignment in areas of avalanche, snow load, and flood risk. Attention will be placed to ensure resilience of the infrastructure. Given that the railway already exists, modification in siting is limited, and risks therefore can likely be mitigated.

Hazards may damage structural components and affect project performance and longevity. However, in practice, climate conditions are not expected to affect performance of Additional Financing components, which involves installation of signaling and telecoms equipment on existing railway lines.

Climate Risk Classification: Medium

¹ Third National Communication Under UNFCCC (2016), p.95

² Third National Communication Under UNFCCC (2016), p.127 Figure 4.45

³ Third National Communication Under UNFCCC (2016), p.133-134

C. Climate Risk and Adaptation Assessment

The risk of climate change on the project's technical scope was assessed based on data on climate change in Uzbekistan. The Aware for Projects tool was used to screen for climate risk at project concept stage. Anticipated changes in the climatic indicators, natural phenomena in the project area (Ferghana valley and Tashkent province) were done based on climatic models presented in Third National Communication for Uzbekistan under the United Nations Framework Convention on Climate Change (2016) and Climate Risk Profile (2015).

It was concluded that the main risks are related to the impact of extremely high temperatures during the heat waves and the increasing frequency of natural phenomena (mudflow and avalanches). The heat waves may negatively impact on the performance of equipment installed at traction substations, as well as the signaling and telecommunications equipment. Besides this, increasing the number of mudflows and avalanches will increase the risk for the safety of train movement in the mountain area traversing the Kamchik pass. The anticipated temperature in the project area will be around 41-42 °C in summer months.

To adapt to the increase in temperature, construction materials resistant to hot weather have been selected. The selected materials are designed to operate in conditions up to 46°C. Each structure housing signaling and telecommunication systems will be equipped with air conditioning to regulate temperature for such sensitive equipment.

The railway being modernized is one which is already under operation. There is already a monitoring and alarm system to detect weather conditions in the mountain area. The Ministry for Emergency Situations maintains the system, and it coordinates communication on poor weather conditions and emergency situations with authorities in charge of road and railway transport. In addition, a landfall warning system will be installed under the project. It will improve the resilience of railway services from climate-related hazards.

D. Climate Risk Screening Tool and/or Procedure Used

Aware for Projects

Climatic models presented in Third National Communication for Uzbekistan under the United Nations Framework Convention on Climate Change (2016) and Climate Risk Profile (2015).

Desk study analysis and consultations with key stakeholders from the Center for Hydrometeorological Services under the Cabinet of Ministers of the Republic of Uzbekistan.

Source: Asian Development Bank.

IV. CLIMATE ADAPTATION PLANS WITHIN THE PROJECT

Adaptation Activity	Target Climate Risk	Estimated Adaptation Costs (\$ million)	Adaptation Finance Justification
Installation of landfall detection and warning system.	Medium	\$ 1.1	The landfall warning system will inform train operators in advance on avalanches and mudflows, and thereby avoid train accidents from occurring. The estimated adaptation cost is associated with incremental cost of this early warning system.

Source: Asian Development Bank estimates.

V. CLIMATE MITIGATION PLANS WITHIN THE PROJECT

Mitigation Activity	Estimated GHG Emissions Reduction (tCO₂e/year)^a	Estimated Mitigation Costs (\$ million)	Mitigation Finance Justification
The whole project is considered a mitigation activity, as it (i) reduces the carbon intensity of train travel, and (ii) induces modal shift away from road transport.	14,870 tCO ₂ /year	\$162.9	Uzbekistan's Third National Communication on Climate Change indicates the promotion of railway transport as a main measure to decrease CO ₂ emission from the transport sector. Construction of the new traction substations and upgrade of transformers will increase capacity of existing railway to transport freight and passengers with electric trains. The increased capacity of the railway will allow a shift in freight and passenger traffic away from road transport to railway and divert passengers and freight away from road modes.

GHG = greenhouse gas, tCO₂e = tons of carbon dioxide equivalent.

Source: Asian Development Bank estimates.

^a The reduction in GHGs emissions is calculated as the annual average over the economic life of the project.

Addition of greenhouse gas emissions saved as a result of diversion from road to rail, and the relative shift from diesel to electric traction, for both passenger and freight trains, assuming emission rates of 31.3 gCO₂ per traffic unit for diesel trains and 12.7 gCO₂ per traffic unit for electric trains, 669 gCO₂ per vehicle-kilometer for trucks and 164 gCO₂ per vehicle-kilometers for passenger cars.