

SUMMARY ECONOMIC AND FINANCIAL SUSTAINABILITY ANALYSIS FOR PROJECT 1

1. The Government of Uzbekistan established the National Road Development Program (2009–2014) in 2009 with the primary objective to improve the efficiency of the transport sector. Particular emphasis was given to improving international road corridors. This program was updated under Resolution No.1446¹ of the President of the Republic of Uzbekistan, dated 21 December 2010 to reconstruct and rehabilitate strategic road corridors. The Central Asia Regional Economic Cooperation Corridor 2 includes sections of the A373 and A380 highways to be completed by 2015. The proposed second investment program with a multitranche financing facility will finance sections of the A373 and the A373/4R112 under tranches 1 and 3 and a section of the A380 under tranche 2.

2. The A380, with a total length of 1,204 kilometers (km) from Guzar to Dautata, is a main route between the northwest and southeast of Uzbekistan and serves as an increasingly important international corridor between Afghanistan, Tajikistan, and Turkmenistan; and Kazakhstan and the Russian Federation. The A373, the Tashkent–Osh highway with a total length of 404 km, is a main road linking the northeastern part of the country and serves as a corridor to the Kyrgyz Republic and further to the Peoples Republic of China, and Central and South Asian regions. The A373/4R112 is an extension of the A373 from Kamchik to Namangan.

3. Government Resolution No. 126,² passed in June 2010, is solely dedicated for the Kamchik mountain pass of the A373 and sets its reconstruction as the utmost priority. The A373 is considered to be the most important road in national and regional contexts as it ensures reliable inter- and intraregional transport links between Fergana valley and other regions of the country. The reconstruction of 74 km of the A373 under tranche 1 of the second investment program will improve connectivity and road safety, and boost domestic and international trade.

4. The economic analysis for the tranche 1 project (project 1) was conducted in accordance with the *Guidelines for Economic Analysis of Projects* of the Asian Development Bank (ADB).³ Project 1 investments yield savings in vehicle operating cost (VOC), operation and maintenance costs, and travel time. The economic evaluation is limited to (i) establishing the economic costs and benefits, and (ii) calculating the internal rate of return and its sensitivity to changes in key input parameters.

A. Economic Rationale of the Project

5. The reduction of VOC, operation and maintenance costs, and travel time has a clear economic benefit since Fergana valley is the center of major industries and services, and the most densely populated part of the country with one-third of the country's total population. The A373 is the sole road connecting Fergana valley with other regions of the country, and plays an important role in the country's socioeconomic development. In addition to cost savings in domestic, regional, and transit traffic, its main contribution is to the growth of domestic and international trade.

¹ Republic of Uzbekistan. 2010. *Resolution No. 1446 of the President Accelerated Development Program (2011–2015) for Infrastructure, Transport and Communications*. Tashkent. (21 December).

² Republic of Uzbekistan. 2010. *Resolution No. 126 of the Cabinet of Ministers, Additional measure to ensure sustainable transport communication via mountain pass Kamchik*. Tashkent. (26 June).

³ ADB. 1997. *Guidelines for Economic Analysis of Projects*. Manila.

B. Alternatives Analysis and Least-Cost Option

6. Alternatives to project 1 are limited. In principle, railways could provide an alternative transport mode; however, this is not a feasible option due the comparably higher cost. Currently, a parallel rail crosses over the territory of Tajikistan. It has a longer distance and requires additional transit fees and hard currency outflow for freight transportation and customs bureaucracy at the border, which makes it unattractive as an alternative for passengers.

C. Traffic Forecast

7. In December 2010, classified traffic counts were carried out over 9 hours at Km 116 of the A373 from Tashkent. Cars account for about 80% of total traffic. The total number of vehicles per day is projected to be 9,913: cars 8,837, buses 25, and trucks 1,051.⁴

8. Traffic is forecast for 30 years following project 1 implementation. As in many developing economies, freight traffic in Uzbekistan is projected to increase at a slightly higher rate than gross domestic product (GDP) growth, while passenger traffic is projected to increase at the product of the population and per capita GDP growth rate.

9. In 2011, Uzbekistan's GDP is forecast to grow at 9%⁵ and from 2012 is assumed to grow at about 8% annually. This is based on strong external trade growth due to the high demand for commodities such as chemicals and hydrocarbons, as well as the strengthened financial sector. For the traffic forecast, demand factors by type of vehicle are projected as 1.1 for passenger cars, 1.085 for trucks, and 1.065 for buses.

10. Generated traffic is additional traffic expected with the project scenario, owing to reduction in VOC and travel times after completion of the proposed road improvements. Generated traffic is calculated as the difference between total projected traffic and normal traffic. Table 1 summarizes the total traffic forecast.

Table 1: Summary of Traffic Forecast

Year	Total Vehicles
	A373, Km 116–Km 190
2011	9,914
2015	18,945
2020	36,240
2025	63,933
2030	108,291
2035	179,367
2040	293,291

km = kilometer.

Source: ADB. 2009. *Technical Assistance to the Republic of Uzbekistan for the CAREC Transport Corridor 2 Road Investment Program*. Manila. (TA 7375-UZB, for \$900,000, approved on 11 November).

⁴ ADB. 2009. *Technical Assistance to the Republic of Uzbekistan for the CAREC Transport Corridor 2 Road Investment Program*. Manila. (TA 7375-UZB, for \$900,000, approved on 11 November).

⁵ ADB. 2010. *Asian Development Bank Outlook 2010*. Manila.

A. Cost-Benefit Analysis

11. Project cost and benefits are estimated in constant 2011 prices, as of the end of February 2011. A domestic price numeraire is used in the analysis. The project reconstruction and rehabilitation period is considered to be from 2011 to 2013, and the completed project to operate until 2040.

12. Capital costs considered in the economic evaluation include project material and construction costs, and physical contingencies, but exclude taxes, price contingencies, and financial charges during reconstruction and rehabilitation. Nontradable goods are valued through shadow prices using a standard conversion factor of 0.95. The following specific conversion factors are used to convert other project costs: 1.2 for skilled labor and 0.7 for unskilled labor. Annual project maintenance costs each year are fixed at \$0.12 million and the cost for one-time periodic maintenance every 20 years accounts for 5% of the total capital cost.

13. The key benefits of the project considered in the economic evaluation are savings in VOC, the value of time saved, and maintenance costs. Road improvements in some instances create benefits in lower accident rates but as this project will increase traffic flow the risk of higher (rather than lower) accident rates is a cost for the economic appraisal. However, for purposes of this case study, accident costs are not included due to lack of realistic data.

14. The VOC is estimated using the road economic decision model of the Highway Development Model 4, which predicts VOC based on the international roughness index. With a current international roughness index at 7, after reconstruction it is assumed to be 4.

15. The time value unit is derived from the travelers' average income taking into account the work travelling ratio per car occupancy. The cost per passenger hour delayed is used to calculate the value of time for passenger cars and buses. The working and nonworking time estimates are calculated for these purposes. The value of working time is directly related to the hourly wage rate. Official data on average salaries is not readily available in the annual statistics produced for Uzbekistan. In accordance with a presidential report in 2010,⁶ the average salary as of 1 January 2011 was approximately \$500 per month. This is used for current calculations assuming that average salary growth is in line with depreciation of the sum against the US dollar. This monthly value is used as the basis for developing the value of working time per hour. Nonworking trips are valued at 30% of the value of working trips.

16. The cost per vehicle-hour delayed of the cargo carried is used to calculate the time value for cargo (trucks). Due to lack of available data in Uzbekistan, data were taken from the previous research carried out as part of the Islamic Development Bank-assisted Borovoe–Kokshetau–Petrovsk Road Rehabilitation Project in Kazakhstan,⁷ and the CAREC Transport Corridor I⁸ in Kazakhstan.

17. All occupants of trucks are assumed to be crew and not passengers. All car occupants (including the driver) are treated as passengers, whereas the total bus occupants are assumed to include one driver (treated as crew), with all remaining occupants treated as passengers. All

⁶ Report of the President of the Republic of Uzbekistan Islam Karimov at the Cabinet Meeting on the Results of Socio-Economic Development of the Country in 2008 and Major Priorities of the Economic Program for 2009.

⁷ Islamic Development Bank. 2003. Feasibility Study Report. Draft, August.

⁸ ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranchise Financing Facility to the Republic of Uzbekistan for the Central Asia Regional Economic Cooperation Corridor 2 Road Investment Program*. Manila

car trips are assumed to be in private use; all other vehicle trips are assumed to be nonprivate.

B. Findings

18. The economic evaluation is based on a comparison of cost and benefits of the 74 km reconstructed section of the A373 under project 1. The cost-benefit calculations show that the project is economically viable with an estimated economic internal rate of return (EIRR) of 17.3%. Economic cost and benefit flows are shown in Table 2.

**Table 2: Cost and Benefit Flow
(\$,000)**

Year	Capital costs	Maintenance cost	Total costs	VOC savings		Time savings	Maintenance savings	Total benefits	Net benefits
				Normal traffic	Generated traffic				
2011	23,619		23,619	-	-	-		-	(23,619)
2012	47,237		47,237	-	-	-		-	(47,237)
2013	47,237		47,237	5,925	1,014	1,291		8,229	(39,008)
2014		120	120	6,474	1,588	1,420	172	9,653	9,533
2015		120	120	7,074	2,214	1,561	172	11,021	10,900
2016		120	120	7,731	2,895	1,716	172	12,514	12,394
2017		120	120	8,449	3,638	1,887	172	14,145	14,025
2018		120	120	9,234	4,447	2,075	172	15,927	15,807
2019		120	120	10,092	5,330	2,281	172	17,875	17,755
2020		120	120	11,031	6,292	2,508	172	20,003	19,883
2021		120	120	12,058	7,342	2,758	172	22,330	22,210
2022		120	120	13,181	8,489	3,033	172	24,874	24,754
2023		120	120	14,410	9,740	3,335	172	27,656	27,536
2024		120	120	15,754	11,107	3,667	172	30,698	30,578
2025		120	120	17,223	12,599	4,032	172	34,026	33,906
2026		120	120	18,832	14,229	4,433	172	37,666	37,545
2027		120	120	20,591	16,010	4,875	172	41,647	41,527
2028		120	120	22,515	17,956	5,360	172	46,004	45,884
2029		120	120	24,621	20,084	5,894	172	50,771	50,651
2030		4,933	4,933	26,925	22,409	6,482	172	55,988	51,055
2031		120	120	29,447	24,951	7,127	172	61,697	61,576
2032		120	120	32,205	27,730	7,838	172	67,945	67,825
2033		120	120	35,224	30,770	8,618	172	74,784	74,664
2034		120	120	38,528	34,094	9,477	172	82,271	82,151
2035		120	120	42,144	37,730	10,422	172	90,467	90,347
2036		120	120	46,102	41,707	11,460	172	99,440	99,320
2037		120	120	50,433	46,058	12,603	172	109,265	109,145
2038		120	120	55,175	50,818	13,859	172	120,023	119,903
2039		120	120	60,364	56,027	15,240	172	131,802	131,682
2040		120	120	66,045	61,726	16,759	172	144,702	144,582
NPV @ 12 %									71,002
EIRR									17.3%

EIRR = economic internal rate of return; NPV = net present value; VOC = vehicle operating cost

Source: Asian Development Bank estimates.

19. The sensitivity of the EIRR to changes in crucial input assumptions was tested. The EIRR exceeds the assumed hurdle rate of 12% for the variations to all parameters. The results of sensitivity analysis are shown in Table 3. Even in the worst case, which combines increasing capital cost by 20% and reducing traffic by 20%, the EIRR would decrease to 13.3%, which is favorable compared with the assumed hurdle rate of 12%. Based on these results, the investment analysis and conclusions are determined to be robust.

Table 3: Results of Sensitivity Analysis
(%)

Scenario	EIRR
Base case	17.3
Capital cost increased by 20%	15.4
Traffic reduced by 20%	15.0
Cost increased by 20% and traffic reduced by 20%	13.3

EIRR = economic internal rate of return.

Source: Asian Development Bank estimates.

C. Financial Sustainability

20. The Republican Road Fund (RRF) is responsible for financing about 19% of the project costs. Its revenue has increased by an average of 25% annually over the last 5 years—from \$220 million in 2006 to \$468 million in 2010. The proceeds from profits and turnover taxes are the most substantial source, averaging 82% of total revenue over the last 5 years.

21. RRF allocations in terms of actual expenditures have increased from about \$270 million in 2006 to \$396 million in 2010. The share of capital expenditures, mainly for reconstruction, has risen steadily from 2006 to 2009 (from 32% of total expenditures in 2006 to 47% in 2009). However, according to projected figures, RRF will allocate 25% of total expenditures to reconstruction in 2011. Meanwhile, the share of new road construction expenditures is projected to rise to 68% in 2011 from 20% in 2006. In 2006–2009, about 40% was allocated to (i) maintenance (routine and periodic combined) 25%, and (ii) rehabilitation 15%.

22. RRF has allocated about 0.23% of GDP for road maintenance. Generally, countries with road funds spend about 0.3% on road maintenance. RRF receives an increasing budget every year as the economy grows. The allocation will be increased with the inflation rate to sustain the investment program to fill the gap. Uzavtoyul, the road agency, will maintain the investment program road with budget provided annually by RRF.