CENTRAL ASIA REGIONAL ECONOMIC COOPERATION
TRADE FACILITATION

CARECCPMM
CORRIDOR PERFORMANCE MEASUREMENT & MONITORING

ANNUAL REPORT
2012

CAREC

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TRADE FACILITATION

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This report is based on trip samples submitted by national transport associations from CAREC member countries that include performance metrics on cargo transport in the region. Using Time-Cost-Distance methodology, the exercise focuses on measuring time and costs incurred in transporting various types of goods across Central Asia. The data are then aggregated to show the relative performance of each CAREC corridor.

For more information, log on to CAREC Federation of Carrier and Forwarder Association (CFCFA) website **http://cfcfa.net/** and visit the CPMM page on **http://cfcfa.net/cpmm/.**

CAREC

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Abbreviations

AAFFCO	–	Association of Afghanistan Freight Forwarders Companies
ABADA	–	Azerbaijan International Road Carriers Association
ABBAT	–	Association of International Automobile Carriers of Tajikistan
ADB	–	Asian Development Bank
ADBL	–	Business Development Logistics Association of Uzbekistan
AIRCUZ	–	Association of International Road Carriers of Uzbekistan
BCP	–	border crossing point
CAREC	–	Central Asia Regional Economic Cooperation
CIQ	–	Customs, Immigration and Quarantine
CPMM	–	Corridor Performance Measurement and Monitoring
CV	–	coefficient of variation
EU	–	European Union
FOA	–	Freight Operators Association of Kyrgyz Republic
GAI	–	State Automobile Inspectorate
IMAR	–	Inner Mongolia Autonomous Region
IMLA	–	Inner Mongolia Autonomous Region Logistics Association
IRU	–	International Road Transport Union
KFFA	–	Kazakhstan Freight Forwarders Association
kph	–	kilometer per hour
MNCCI	–	Mongolia National Chamber of Commerce and Industry
NARTAM	–	National Road Transport Association of Mongolia
PIFFA	–	Pakistan International Freight Forwarder Association
PRC	–	People's Republic of China
QR	–	Quarterly Report
SWD	–	Speed with delay
SWOD	–	Speed without delay
TCD	–	time-cost-distance
TEU	–	twenty-foot equivalent unit
TIR	–	Transports Internationaux Routiers
XUAR	–	Xinjiang Uygur Autonomous Region

NOTE

In this report, "$" refers to US dollars.

Executive Summary

The 2012 Annual Report of ADB's Corridor Performance Monitoring and Measurement (CPMM) provides valuable statistical data to evaluate freight flows and costs along the six transport corridors of the Central Asia Regional Economic Cooperation (CAREC) Program.

Adopted in 2007 as part of CAREC's Transport and Trade Facilitation Strategy, CPMM supports policy reforms to improve transport links and facilitate trade between CAREC's ten countries. It identifies bottlenecks, unofficial costs and other impediments to the smooth flow of goods.

The report features the impact of the Customs Union between Belarus, Kazakhstan and Russia which was launched on January 1, 2010 and saw customs borders effectively removed from July 2011. One positive consequence was that the average crossing time for trucks moving from Kazakhstan to Russia fell sharply to 2.9 hours in 2012 from 7.7 hours in 2011. Trade jumped 66% in 2011.

Conversely, however, average crossing times between Kazakhstan and non-Custom Union countries lengthened considerably from 8.6 hours to 21.5 hours over the same period. Such long delays, occurring mainly at a handful of border crossing points (BCPs), distorted the overall BCP performance.

To evaluate transport and trade flows, CPMM uses four trade facilitation indicators (TFIs). TFI1 is the time taken to cross a BCP measured in hours; TFI2 is the cost of a border crossing clearance measured in US dollars ($); TFI3 is the cost of traveling along a road section measured in $ per 20-ton cargo per 500 km; and TFI4 is the speed of traveling along CAREC corridors in kilometers per hour (kph). Based on 3,194 data samples collected in 2012 on road, rail, and multimodal freight shipments, CPMM observed several major trends.

- The overall average time to cross a BCP (TFI1) increased to 10.9 hours in 2012 from 7.9 hours in 2011. However, the median time to cross a BCP has remained the same since 2010, indicating that the overall increase was attributed to extreme delays in freight entering the Kazakhstan–Russia–Belarus Customs Union economic space as well as adverse weather conditions and the temporary closure of BCPs to transit shipments.
- The overall average cost of a border crossing clearance (TFI2) remained virtually unchanged (rising to $157 in 2012 from $156 in 2011) and was less costly than in 2010.
- The overall cost of transporting a 20-ton cargo along a 500 km section (TFI3) rose to $998 in 2012 from $959 in 2011 and this included increases in fuel prices, driver salaries and other operating costs.
- The overall average speed of travel (TFI4) was measured by two indicators. One is speed with delay (SWD)[1], which includes border crossing times and reflects BCP efficiency. The other is speed without delay (SWOD), which excludes border crossing times and reflects the quality of transport infrastructure. In 2012, SWD improved modestly to 22.9 kph from 21.9 in 2011. SWOD remained virtually unchanged year on year.

The speed indicators revealed considerable differences in performance between the six CAREC corridors. For road transport, SWOD ranged from 33 kph to 47 kph and SWD from 17 kph to 28 kph. Vehicles on corridor 1 moved at a relatively high speed while vehicles on corridor 5 moved slowly. Along the sub-corridors, the slowest speeds were recorded on corridors 5, 4b, and 6c (SWOD) and 5, 4b, and 6b (SWD). The main reason was waiting times at borders.

Regarding road transport costs, the five most commonly encountered payments were for border security/control, customs clearance, health/phytosanitary, vehicle registration, and transport inspection.

For railway transport, the average train speed ranged from 15 kph to 45 kph for SWOD and from 7 kph to 22 kph for SWD. Trains traveled fastest along Corridor 1 and slowest along Corridor 4. The major causes of delay included a change of gauge and waiting in line. In terms of costs, the most common and costly causes were a change of gauge, customs clearance, and loading/unloading.

CPMM reported that the five most commonly transported goods in 2012 were agricultural products, textiles, base metals, industrial materials, and machinery. The often high proportion of perishable agricultural goods – which accounted for nearly 40% of goods on Corridor 1, for example –underscored the need for timely delivery and efficient infrastructure.

While describing the speed, time, and cost factors influencing freight flows within CAREC, including the variability and reliability of key indicators, CPMM usefully identifies the main activities that raise costs and cause long delays when crossing borders.

Unofficial payments – any payment other than the stated official cost of an activity – remained a major factor in keeping costs high. Although the sensitive nature of unofficial payments makes it difficult to capture full information, CPMM collected data on unofficial payments at each stop along a journey and tallied it to estimate the overall cost to shipments along a corridor. The frequency and magnitude of unofficial payments was presented in a summary table.

1 Please refer to Page 7 for a detailed explanation on the difference between SWOD and SWD.

The five most common activities where truck drivers encountered unofficial payments were customs clearance, police checkpoints, border security/control, weight/standard inspection, and vehicle registration. In terms of the amount of unofficial payments, CPMM ranked the top activities as escort/convoy, customs clearance, loading/unloading, border security/controls, and road tolls.
Most unofficial payments were recorded on corridor 1 where the bulk of the samples were collected. A noticeable share of unofficial payments was also collected during GAI/traffic inspection along corridor 3, at police checkpoints along corridor 4, at road tolls and customs clearance points along corridor 5, and at road tolls and police checkpoints along corridor 6.

To examine the issue more closely, CPMM also estimated the probability of encountering unofficial payments. In 2012, CPMM reported there were 4,072 stops for 'customs clearance.' There were 3,310 instances of 'customs clearance' at BCPs and 762 at non-BCP stops. A total of 1,189 unofficial payments were recorded at BCPs and 94 at non-BCP stops.

CPMM estimated there is a 32% chance of encountering a demand for unofficial payments during customs clearance. The amount for unofficial payments during customs clearance averaged $44 at BCPs and $32 in non-BCP stops.

Analyzing the reasons for lengthy delays, CPMM identified bottlenecks and other causes in each of the six CAREC corridors.

- Corridor 1 is the most active and by far the longest corridor, linking PRC with Europe. The two BCPs, which combined CAREC's highest freight throughput with long delays, were at Khorgos (PRC) and Khorgos (Kazakhstan) for road and Alashankou (PRC) and Dostyk (Kazakhstan) for rail. Even with delays at BCPs, however, trucks traveled fastest along this corridor compared to others.
- Corridor 2 crosses six countries, including a ferry service across the Caspian Sea to link with Turkey. The BCPs that registered significant time delays were Tazhen (Kazakhstan)-Dautota (Uzbekistan) and Alat (Uzbekistan)–Farap (Turkmenistan). Vehicles moved on this corridor at an average speed of 43 kph.
- Corridor 3 links Russia to Middle East in the southwest and provides access to Iranian ports. Trucks experienced significant BCP delays at Sarakhs in Iran and Sarahs in Turkmenistan as well as along an alternative route at BCPs at Luftabad (Iran) and Artik (Turkmenistan). In addition, border crossing times at the frequently used BCPs at Konysbaeva (Kazakhtan)-Yallama (Uzbekistan) and Alat (Uzbekistan)–Farap (Turkmenistan) ranged from 8 to 10 hours. One cause of delay at Konysbaeva is the layout where trucks have to execute an acute turn on a narrow paved road to the entry gate. Despite such bottlenecks, vehicles moved along corridor 3 at an average speed of 47 kph.
- Corridor 4 crosses Mongolia and is the shortest route connecting PRC with Russia. Although no specific bottlenecks were reported, the average time to cross a BCP increased to 12.2 hours in 2012 from 11.8 hours in 2011. Due to high vehicle operating costs, a border crossing is more expensive than on others except corridor 1. In 2012, though, the average cost of a border crossing did fall to $173 from $182 in 2011. This corridor recorded the slowest speed for freight trains, with goods from Tianjin taking an average 12 to 14 days to reach Ulaanbaatar. Lack of rolling stock and inadequate infrastructure caused long waiting times at the key railway terminals of Tolgoit, Choyr, and Sainshand.
- Corridor 5 links Afghanistan and Pakistan with PRC and, with challenging terrain and climatic conditions, recorded the slowest road speeds with vehicles moving at an average 33 kph. Causes of significant delays at BCPs at Irkeshtan (PRC) and Karamyk (Kyrgyz Republic) included a two-stop process in PRC for cross-border clearance formalities at Irkeshtan and Wujia; Irkeshtan BCP working only 5 days a week; and the longer time to travel the windy, narrow, and dusty road between Wujia to Irkeshtan.
- Corridor 6 links South Asia and the Middle East with Europe. Long BCP waiting times at Tazhen (Kazakhstan) were attributed to its design. CPMM noted that separating trucks and cars as well as having a dedicated lane for TIR trucks could cut delays. Vehicles on this corridor moved at an average 38 kph.

CPMM noted as an encouraging model the trade facilitation reforms in Georgia which have reduced border crossing delays markedly and are expected to produce significant economic benefits, including bringing down vehicle operating costs.

The 2012 CPMM Annual Report provides more information than in earlier years and includes data and tables on cargo movement (to describe direction of trade), margin of errors (reliability of TFIs), decomposition of time and cost information, and analyses of road and rail transport.

If the ambitious objectives of CAREC 2020 are to be achieved, decisive and concerted efforts must be made regionally to reduce the economic impact of crossing borders. Under CAREC, renovations of BCPs, harmonization of customs procedures, automation of information systems, adoption of single-window facilities and better border control risk management systems remain priority initiatives to facilitate smoother and more cost-effective transportation.

Collaboration between the government and the private sector is imperative to reduce impediments to the smooth flow of goods. The Asian Development Bank, through the CAREC program, will continue to play a facilitating role, providing technical assistance and funding key investments.

I. Background

The ten countries[2] participating in the Central Asia Regional Economic Cooperation program (CAREC) comprise in the aggregate a landlocked yet resource-rich region. The CAREC countries depend heavily on one another for access to international markets. Without intensifying their cooperation with one another, the immense opportunity they have – individually and collectively – to reap the full potential gains from international trade may be squandered. Realizing this potential will require significant improvement in the physical infrastructure, modernization of customs administrations, improved interagency and cross-border communication, and streamlining of the rules and procedures that govern the countries' international trade relationships.

The CAREC program is committed to promote development through cooperation. The Program is a proactive facilitator of practical, results-based regional projects, and policy initiatives critical to trade expansion and sustainable development. The CAREC Transport and Trade Facilitation Strategy (TTFS)[3] and its Implementation Action Plan[4] aims to improve the region's competitiveness and expand trade among CAREC economies and with the rest of the world. The Strategy mandates that the performance of six priority CAREC corridors be measured and monitored. These corridors link the region's key economic hubs to each other, and connect CAREC countries to other Eurasian and global markets.[5]

- CAREC Corridor 1: Linking Europe and East Asia. The most active of the six corridors that links Europe to the People's Republic of China (PRC) and East Asia. The corridor extends from the border with the Russian Federation to the PRC via Kazakhstan and the Kyrgyz Republic. It comprises 13,600 km of roads and 12,000 km of railways, 1 logistics center, and 3 airports.

- CAREC Corridor 2: Linking the Mediterranean and East Asia. The route covers Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan, the Kyrgyz Republic, and the PRC. It comprises 9,900 km of roads and 9,700 km of railways.

- CAREC Corridor 3: Linking the Russian Federation with the Middle East and South Asia. It has 6,900 km of roads and 4,800 km of railways, running from west and south of Russia's Altay region through Kazakhstan, the Kyrgyz Republic, Tajikistan, Afghanistan, Turkmenistan, and Uzbekistan to the Middle East and South Asia.

- CAREC Corridor 4: Linking the Russian Federation and East Asia. It connects the Russian Federation to East Asia via Mongolia and the PRC. The route comprises 2,400 km of roads and 1,100 km of railways.

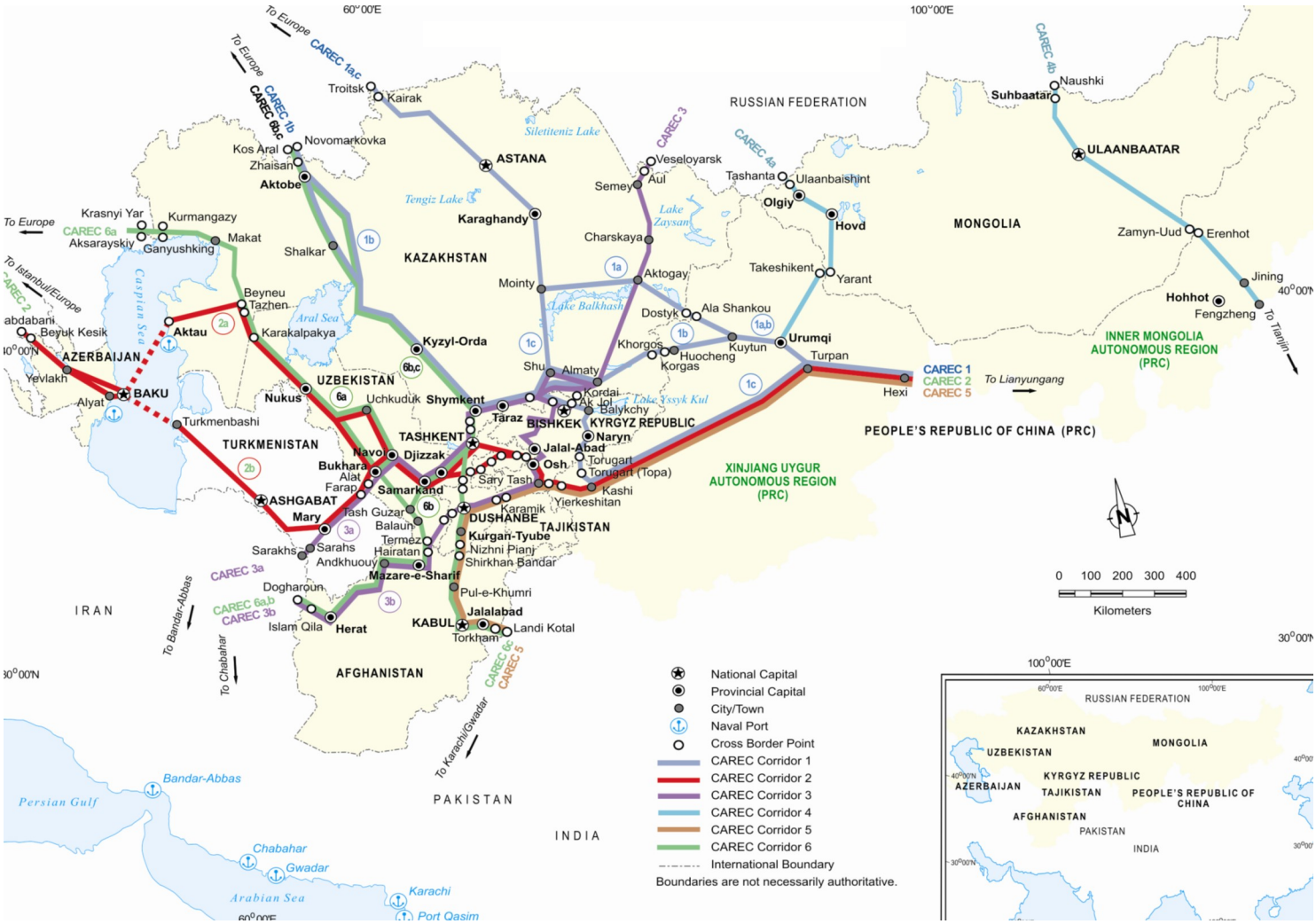
- CAREC Corridor 5: Linking East Asia with the Middle East and South Asia. It connects East Asia to the Arabian Sea through Central Asia. The route covers the PRC, the Kyrgyz Republic, Tajikistan, and Afghanistan. The corridor has 3,700 km of roads and 2,000 km of railways.

- CAREC Corridor 6: Linking Europe with the Middle East and South Asia. It includes three routes extending from Afghanistan's borders with Pakistan and Iran to Kazakhstan's borders with Russia, traversing Uzbekistan and Tajikistan, ultimately linking Europe and the Russian Federation to the Arabian Sea port of Karachi and Gwadar or Bandar Abbas in the Persian Gulf. The route has 10,600 km of roads and 7,200 km of railways.

Corridor Performance Measurement and Monitoring (CPMM) was initiated to identify sources of excessive cost and delays encountered by goods in transit and determine courses of action to eliminate these impediments. The CPMM, which has been collecting time and cost data monthly since 2009, is intended to serve as a useful guide for CAREC country decision-makers (and their development partners) in policy formulation, investment decisions, and process improvements. Shippers and producers can also use CPMM to select the most reliable routes and anticipate delivery times to improve inventory management. CPMM is a region-wide study of transport and trade efficiency in the CAREC region. CPMM was conceptualized to provide a robust, consistent, and practical

2 Afghanistan, Azerbaijan, the Inner Mongolia and Xingjian-Uygur Autonomous Regions of the People's Republic of China, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan.
3 Endorsed by the Sixth Ministerial Conference on CAREC. 2007. Dushanbe.
4 Endorsed by the Seventh Ministerial Conference on CAREC. 2008. Baku.
5 http://www.carecprogram.org/index.php?page=carec-corridors

Six Central Asia Regional Economic Cooperation Corridors



methodology to capture what is really happening to shipments in the region. Pivotal to the data collection is the traffic volume along six CAREC corridors, which provides the basis for measurement of the time and cost for shipments to move through these corridors. The time-cost-distance (TCD) methodology developed by the United Nations Economic and Social Commission for Asia and the Pacific has been customized and designed for CAREC countries which heavily rely on road and rail transport.

A unique characteristic of CPMM is ADB's partnership with national transport and trade associations[6] to collect data. Extensive empirical data is collected from the drivers, who are closest to the actual situation on the ground and are keenly aware of the problems in transit and deliveries. Data were defined, processes were standardized, and trainings were conducted to yield reliable, comparable information on shipments along the CAREC corridors. Other partners are being sought to increase the volume of rail data in the CPMM database so that a fuller understanding of freight movements and multimodal transport and trade efficiency in the CAREC region might be obtained.

6 See Appendix 1.

II. Data Description

In 2012, a total of 3,194 samples were collected. The decrease of 32% from the 4,754 samples collected in 2011 was the result of a more selective and focused strategy–to concentrate on shipments along the six CAREC corridors. Further, the performance of CPMM partners was evaluated and some changes were made to improve the quality of data.

Using the raw data collected monthly by partner associations, estimates on the time, cost, speed, and reliability were derived. Road continued to be the dominant mode of transport, accounting for 80% of all shipment data collected. About 17% of the shipments were transported by rail and the remaining 3% by multimodal transport. Of all the shipments, 22% carried perishables, demonstrating that agricultural products are widely traded in CAREC. Among 2,551 samples of road transport, 46% utilized Transports Internationaux Routiers (TIR or International Road Transports) carnets. Finally, 78% of all shipments experienced at least one border crossing.[7] Samples from Kazakhstan and the PRC's Inner Mongolia Autonomous Region contributed most of the domestic shipments data as they cover relatively larger geographical areas.

The top five most commonly shipped products in 2012, comprising 61% of all cargo movements observed, were (i) agricultural products, (ii) textiles, (iii) base metals, (iv) industrial materials, and (v) machinery. Manufactured items and base metals accounted for the second and sixth most commonly shipped products in 2011. Broadly speaking, CPMM reaffirmed the importance of these commodities in CAREC regional trade in 2012.

CPMM also provides some insight into the direction of trade because each sample contains information on the origin and destination of shipments. This information was aggregated to map the flow of goods. Exporting countries such as the PRC and the Russian Federation[8] provided more outbound samples while importing countries such as Kazakhstan and Mongolia provided more inbound samples. The last category–others (OTH)–consists of non CAREC member countries, such as Iran and Turkey.

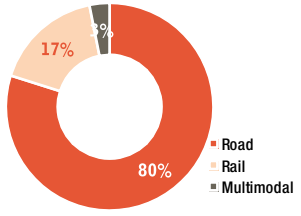
Shipments are typically categorized into four types: export, import, transit, or domestic. Most CPMM samples belonged to the first three categories which captured the transport and trade efficiency across countries along the CAREC corridors consistent with the sharpened focus on CAREC corridor traffic sampled in 2012. Currently, CPMM does not categorize shipments by type, although this may be useful. Using the case of Afghanistan, for example, CPMM data samples suggest that import and export shipments observed in Afghanistan are seemingly well-balanced. They do not reflect the actual direction of trade, however: overall trade statistics show that Afghanistan serves primarily as a transit country that provides access to seaports around Karachi.

7 For shipments in Afghanistan, the samples only show domestic transport due to the restriction of Afghan drivers to cross foreign countries.

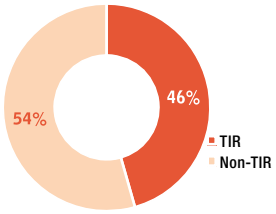
8 Although Russia is not a CAREC member country, it was categorized separately rather than being included in the category 'Others' because of the substantial traffic between Russia and its neighboring CAREC member countries.

Data Profile

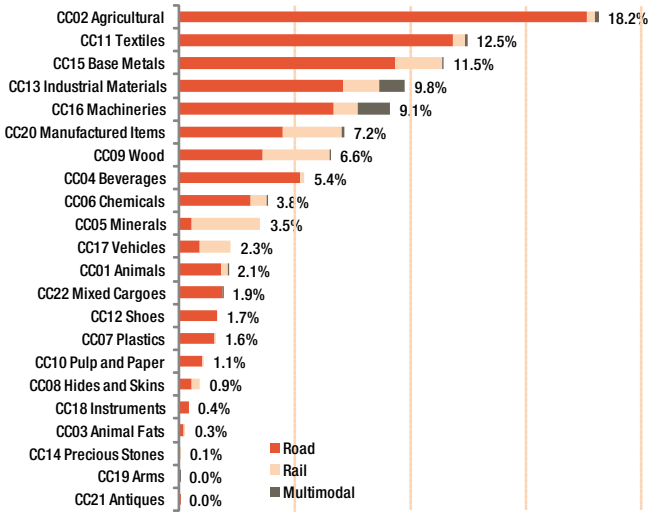
Mode of Transport



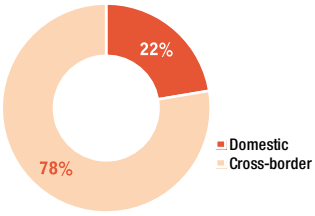
Use of TIR



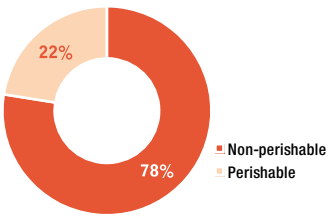
Type of Commodities Transported, by mode of transport



Cross-border Transports

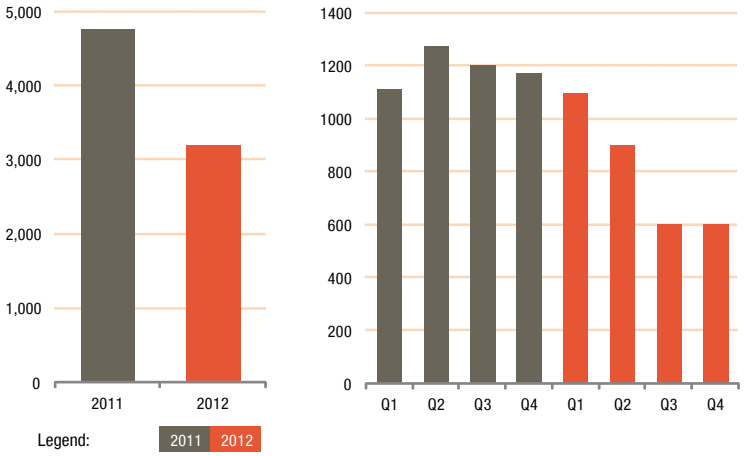


Perishable Cargo



Data Sample

TCD Sample

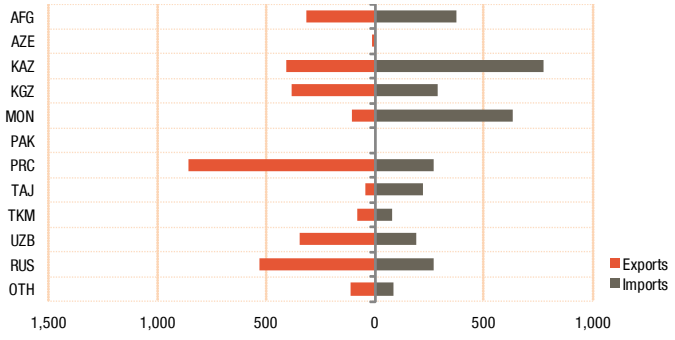


2012 TCD Sample by Association

Country	Association	2012 Q1	Q2	Q3	Q4	2012	2011
AFG	AAFFCO	90	90	60	60	300	360
AZE	ABADA	15				15	49
KAZ	KAZATO	90				90	360
	KFFA	90	90	60	60	300	360
KGZ	AIA	90	89	60	60	299	294
	FOA	90	90	60	60	300	360
MON	NARTAM	90	90	60	60	300	360
	NTTFC	90	90	60	60	300	360
PRC	IMAR	90	90	60	60	300	360
	XUAR	90	90	60	60	300	270
TAJ	ABBAT	90				90	360
UZB	ADBL	90	90	60	60	300	360
	AIRCUZ	90	90	60	60	300	360
Total		1,095	899	600	600	3,194	4,754

Cargo Movement

Exports and Imports by Country, count based on sample



Origin	Destination AFG	AZE	KAZ	KGZ	MON	PAK	PRC	TAJ	TKM	UZB	RUS	OTH	Total
AFG	300	-	-	13	-	-	-	-	-	-	-	-	313
AZE	-	-	-	2	-	-	-	-	-	-	-	13	15
KAZ	4	-	264	59	-	-	-	5	5	39	33	-	409
KGZ	72	2	72	-	-	-	10	60	6	5	118	34	379
MON	-	-	-	-	18	-	90	-	-	-	-	-	108
PAK	-	-	-	-	-	-	-	-	-	-	-	-	0
PRC	-	-	207	61	420	-	90	70	-	-	1	6	855
TAJ	-	-	2	2	-	-	-	41	-	-	-	1	46
TKM	-	-	4	7	-	-	-	29	-	27	14	1	82
UZB	-	-	154	2	-	-	-	5	55	1	102	27	346
RUS	-	-	60	103	198	-	78	7	10	73	-	3	532
OTH	1	1	14	37	-	-	-	2	2	48	2	2	109
Total	377	3	777	286	636	0	268	219	78	193	270	87	3,194

III. Trade Facilitation Indicators

The development of a CAREC Program Results Framework to serve as the basis for an annual comprehensive development effectiveness review to track progress and achievements was endorsed at the 2009 CAREC Senior Officials' Meeting. Further, the indicators for trade facilitation were discussed and approved at the 2010 Regional Joint Transport and Trade Facilitation Meeting held in Tashkent, Uzbekistan. CPMM provides these indicators to the CAREC development effectiveness review as one means to measure progress in the trade facilitation priority area.

There are four high level indicators in CPMM–the Trade Facilitation Indicators (TFIs). TFIs are used to monitor and report the impact of transport and trade facilitation projects in the region by estimating the: time it takes to cross a border crossing point (BCP) in hours (TFI1); cost incurred at border crossing clearance in US dollars ($) (TFI2); cost incurred to travel a corridor section measured in $ per 500 km per 20-ton cargo (TFI3); and speed to travel along CAREC corridors in kilometers per hour (kph) (TFI4). CPMM uses a concise set of indicators that allows a time-series comparison to present the trend and validate evidence of improvement in transport infrastructure and trade facilitation over time.

As TFIs capture the sum of actions taken by many different entities involved in trade facilitation in the CAREC countries, it is not possible to attribute improvement directly to CAREC-related activities. However, contributing factors carried out under CAREC may include: (i) improvement of BCP facilities by CAREC countries, multilateral institution partners, and other development partners; (ii) adoption of new and/or amended customs codes by a majority of CAREC countries, (iii) investments in the modernization and automation of customs information systems; and (iv) efforts to establish national single windows (NSW) and upgrade border control risk management systems.

Components of Normalized Cost to Travel a 500-km Corridor Section

		Overall						Road						Rail					
		2011			2012			2011			2012			2011			2012		
	Corridor	Total	Transit	Activity	Total	Transit	Activity	Total	Transit	Activity	Total	Transit	Activity	Total	Transit	Activity	Total	Transit	Activity
TFI3	Cost incurred to travel a corridor section (per 500km, per 20-ton cargo)																		
	Overall	959	822	165.8	999	830	198.6	1,055	898	182.3	1,068	875	218.9	503	462	60.3	638	591	76.2
	1	803	640	200.0	1,159	949	252.8	909	705	225.5	1,234	983	269.0	477	441	67.7	864	809	156.2
	2	679	603	96.4	563	455	168.1	679	601	96.4	541	431	168.1	665	665	-	1,613	1,613	
	3	1,012	939	159.5	1,076	912	191.6	1,040	965	159.5	1,076	907	191.6	476	476	-	1,059	1,059	
	4	1,213	1,187	30.5	933	893	47.3	1,663	1,661	12.9	1,322	1,284	54.4	536	481	55.3	428	390	38.1
	5	1,592	1,256	336.3	1,580	1,178	401.9	1,592	1,256	336.3	1,580	1,178	401.9	-	-	-			
	6	929	724	219.6	719	549	192.3	950	737	219.6	726	553	192.3	414	414	-	346	346	
%	Percentage to Total Cost																		
	Overall		83%	17%		81%	19%		83%	17%		80%	20%		88%	12%		89%	11%
	1		76%	24%		79%	21%		76%	24%		79%	21%		87%	13%		84%	16%
	2		86%	14%		73%	27%		86%	14%		72%	28%		100%	0%		100%	0%
	3		85%	15%		83%	17%		86%	14%		83%	17%		100%	0%		100%	0%
	4		97%	3%		95%	5%		99%	1%		96%	4%		90%	10%		91%	9%
	5		79%	21%		75%	25%		79%	21%		75%	25%						
	6		77%	23%		74%	26%		77%	23%		74%	26%		100%	0%		100%	0%

Note: The sum of the averages, of transit and activity costs, is not equal to the average of the sum, total cost. This is due to zero component in the sum which is not included in their individual averages. Percentages are derived as the ratio to the sum of transit and activity cost average.

Trade Facilitation Indicators

TFI1 — Time taken to clear a border crossing point (hr)

Corridor	Overall 2011 Mean	Overall 2011 Median	Overall 2011 Margin	Overall 2012 Mean	Overall 2012 Median	Overall 2012 Margin	Road Transport 2011 Mean	Road Transport 2011 Median	Road Transport 2011 Margin	Road Transport 2012 Mean	Road Transport 2012 Median	Road Transport 2012 Margin	Rail Transport 2011 Mean	Rail Transport 2011 Median	Rail Transport 2011 Margin	Rail Transport 2012 Mean	Rail Transport 2012 Median	Rail Transport 2012 Margin
Overall	7.9	4.1	± 0.5	10.9	4.2	± 0.7	6.2	3.6	± 0.2	8.9	3.4	± 0.7	22.3	12.0	± 3.6	24.7	24.0	± 1.3
1	8.5	3.3	± 0.6	13.7	3.0	± 2.0	6.2	2.5	± 0.5	12.4	2.1	± 2.3	21.2	8.2	± 2.2	22.6	17.0	± 2.5
2	8.6	7.2	± 0.5	11.6	5.9	± 1.4	8.6	7.2	± 0.5	11.7	6.0	± 1.4	5.0	4.6	± 0.7	4.0	3.3	± 1.5
3	5.5	3.8	± 0.6	7.1	5.3	± 0.8	5.5	3.8	± 0.6	7.2	5.4	± 0.8	3.3	2.3	± 1.8	5.1	4.6	± 1.4
4	10.3	5.0	± 2.0	12.2	6.3	± 0.7	4.9	3.6	± 0.2	5.3	4.0	± 0.2	24.4	16.5	± 6.3	26.6	24.0	± 1.5
5	6.8	2.9	± 0.6	8.3	2.3	± 3.1	6.8	2.9	± 0.6	8.3	2.3	± 3.1	-	-	-	-	-	-
6	5.6	3.8	± 0.3	7.5	2.5	± 0.9	5.6	3.9	± 0.3	7.6	2.5	± 0.9	2.8	2.2	± 0.8	3.2	2.4	± 1.4

TFI2 — Cost incurred at border crossing clearance (US$)

Corridor	Overall 2011 Mean	Overall 2011 Median	Overall 2011 Margin	Overall 2012 Mean	Overall 2012 Median	Overall 2012 Margin	Road Transport 2011 Mean	Road Transport 2011 Median	Road Transport 2011 Margin	Road Transport 2012 Mean	Road Transport 2012 Median	Road Transport 2012 Margin	Rail Transport 2011 Mean	Rail Transport 2011 Median	Rail Transport 2011 Margin	Rail Transport 2012 Mean	Rail Transport 2012 Median	Rail Transport 2012 Margin
Overall	156	90	± 4	157	76	± 6	148	89	± 4	146	62	± 6	223	100	± 14	280	145	± 28
1	156	69	± 8	175	45	± 13	143	69	± 8	139	40	± 10	235	100	± 27	465	164	± 71
2	142	140	± 6	166	101	± 13	142	140	± 6	166	101	± 13	-	-	± 0	-	-	-
3	91	58	± 6	168	103	± 16	91	58	± 6	168	103	± 16	-	-	-	-	-	-
4	182	45	± 11	173	45	± 13	169	30	± 15	172	15	± 17	213	100	± 15	176	144	± 10
5	201	102	± 25	151	100	± 15	201	102	± 25	151	100	± 15	-	-	-	-	-	-
6	149	140	± 5	90	88	± 5	149	140	± 5	90	88	± 5	-	-	-	-	-	-

TFI3 — Cost incurred to travel a corridor section (per 500km, per 20-ton cargo)

Corridor	Overall 2011 Mean	Overall 2011 Median	Overall 2011 Margin	Overall 2012 Mean	Overall 2012 Median	Overall 2012 Margin	Road Transport 2011 Mean	Road Transport 2011 Median	Road Transport 2011 Margin	Road Transport 2012 Mean	Road Transport 2012 Median	Road Transport 2012 Margin	Rail Transport 2011 Mean	Rail Transport 2011 Median	Rail Transport 2011 Margin	Rail Transport 2012 Mean	Rail Transport 2012 Median	Rail Transport 2012 Margin
Overall	959	637	± 27	999	621	± 43	1,055	704	± 33	1,068	670	± 50	503	424	± 23	638	452	± 54
1	803	481	± 51	1,159	604	± 116	909	529	± 71	1,234	603	± 142	477	333	± 36	864	638	± 116
2	679	524	± 37	563	476	± 41	679	523	± 39	541	475	± 37	665	577	± 99	1,613	1,429	± 839
3	1,012	502	± 88	1,076	898	± 79	1,040	515	± 96	1,076	897	± 82	476	445	± 89	1,059	914	± 278
4	1,213	860	± 65	933	725	± 44	1,663	1,441	± 87	1,322	1,364	± 50	536	531	± 32	428	452	± 19
5	1,592	1,198	± 107	1,547	1,228	± 120	1,592	1,198	± 107	1,547	1,228	± 120	-	-	-	-	-	-
6	929	666	± 51	721	536	± 50	950	690	± 55	729	537	± 50	414	350	± 63	346	325	± 117

TFI4 — Speed to travel on CAREC Corridors (Speed with Delay, kph)

Corridor	Overall 2011 Mean	Overall 2011 Median	Overall 2011 Margin	Overall 2012 Mean	Overall 2012 Median	Overall 2012 Margin	Road Transport 2011 Mean	Road Transport 2011 Median	Road Transport 2011 Margin	Road Transport 2012 Mean	Road Transport 2012 Median	Road Transport 2012 Margin	Rail Transport 2011 Mean	Rail Transport 2011 Median	Rail Transport 2011 Margin	Rail Transport 2012 Mean	Rail Transport 2012 Median	Rail Transport 2012 Margin
Overall	21.9	20.2	± 1.6	22.9	25.0	± 0.4	24.5	23.5	± 1.5	25.9	29.4	± 0.4	17.7	13.0	± 4.5	14.5	10.0	± 0.7
1	25.6	22.0	± 3.2	25.2	26.6	± 0.6	29.9	29.7	± 3.4	28.1	29.4	± 0.7	21.9	17.0	± 6.1	18.9	18.7	± 1.0
2	22.7	22.3	± 2.8	22.1	20.9	± 0.8	22.5	22.1	± 2.7	22.1	20.9	± 0.9	24.9	23.3	± 21.8	22.4	20.1	± 3.1
3	22.4	23.3	± 3.9	21.9	20.7	± 1.2	22.9	23.7	± 3.8	23.5	21.7	± 1.3	20.6	20.7	± 16.0	16.8	15.2	± 2.6
4	11.8	8.1	± 2.8	12.2	8.2	± 0.6	20.1	17.7	± 2.7	20.4	18.6	± 0.7	6.5	6.4	± 1.6	6.7	6.5	± 0.2
5	19.4	21.8	± 3.6	17.3	17.9	± 0.8	19.4	21.8	± 3.6	17.3	17.9	± 0.8	-	-	-	-	-	-
6	22.9	23.6	± 3.1	27.6	30.2	± 0.6	23.5	24.1	± 2.8	28.0	30.2	± 0.6	20.8	16.4	± 17.8	17.0	16.5	± 2.9

SWOD — Speed Without Delay (kph)

Corridor	Overall 2011 Mean	Overall 2011 Median	Overall 2011 Margin	Overall 2012 Mean	Overall 2012 Median	Overall 2012 Margin	Road Transport 2011 Mean	Road Transport 2011 Median	Road Transport 2011 Margin	Road Transport 2012 Mean	Road Transport 2012 Median	Road Transport 2012 Margin	Rail Transport 2011 Mean	Rail Transport 2011 Median	Rail Transport 2011 Margin	Rail Transport 2012 Mean	Rail Transport 2012 Median	Rail Transport 2012 Margin
Overall	38.0	39.9	± 2.1	37.8	35.5	± 0.6	43.0	43.5	± 1.9	39.4	35.5	± 0.7	30.1	34.3	± 5.4	33.5	39.9	± 1.0
1	44.6	46.3	± 3.2	41.9	37.1	± 0.5	52.1	53.2	± 3.0	40.7	35.5	± 0.7	38.0	41.0	± 5.9	44.5	44.0	± 0.6
2	40.0	43.3	± 3.5	42.9	42.4	± 1.0	40.4	43.5	± 3.5	43.1	42.5	± 1.1	36.1	38.5	± 23.8	40.9	41.5	± 3.5
3	40.8	38.9	± 4.6	44.9	39.0	± 5.3	43.2	44.0	± 4.6	47.1	39.9	± 6.4	32.8	34.9	± 12.3	37.8	38.4	± 1.6
4	22.6	13.7	± 6.8	22.9	19.6	± 0.9	41.0	35.8	± 7.6	34.3	33.0	± 1.1	11.0	9.9	± 2.7	15.3	14.7	± 0.6
5	30.5	30.6	± 3.2	33.1	30.4	± 1.2	30.5	30.6	± 3.2	33.1	30.4	± 1.2	-	-	-	-	-	-
6	36.7	36.2	± 2.8	37.4	35.2	± 0.6	37.6	38.2	± 2.8	37.5	35.2	± 0.7	33.2	32.4	± 9.9	36.2	35.5	± 3.2

Legend
- Better than same period last year, significant at 5% level
- Worse than same period last year, significant at 5% level
- Insignificant change

Note Margin refers to the 95% confidence interval band around the mean estimate.

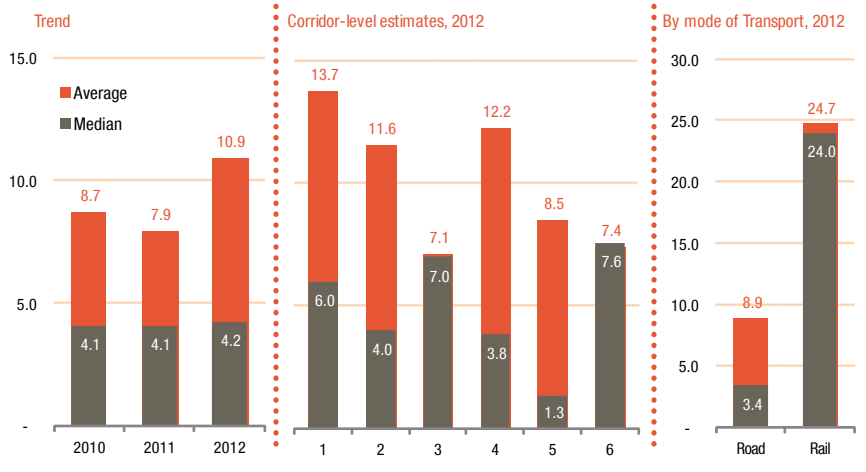
CPMM uses two measures of speeds, namely Speed without Delay (SWOD) and Speed with Delay (SWD). SWOD is derived as a ratio of the distance travelled to the time spent by a vehicle in motion between origin and destination (actual traveling time). On the other hand, SWD is derived as the ratio of distance travelled to the total time taken to traverse the entire journey, which includes transit time as well as time spent on stop activities. In CPMM, all activities that delay transit (such as customs clearance, inspections, loading/unloading and police checkpoints, among others) are recorded by drivers. SWOD represents a measure of the condition of physical infrastructure (such as road and railways), while SWD is an indicator of the efficiency of border crossing points along the corridors.

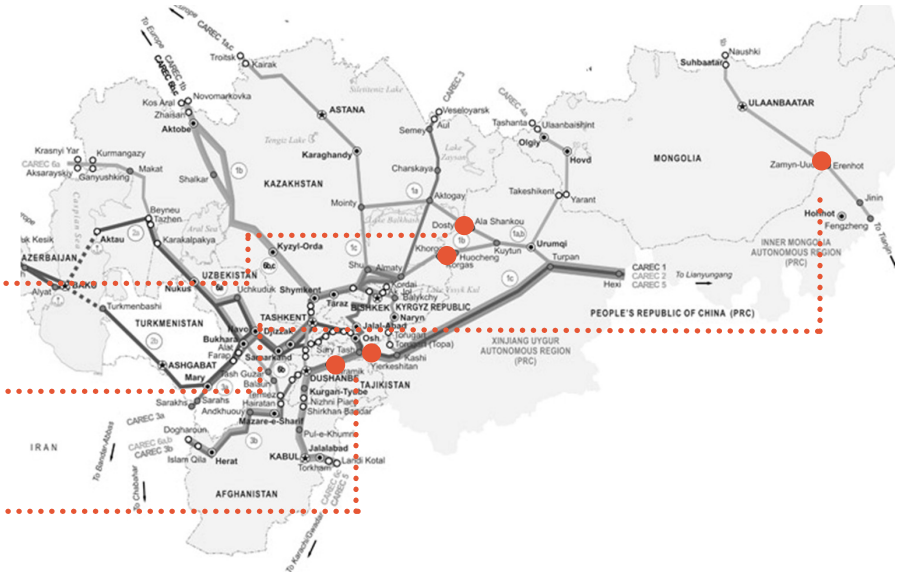
TFI1 Time Taken to Cross a Border Crossing Point

(in hours)

The overall average time spent to cross a BCP increased to 10.9 hours in 2012 from 7.9 hours in 2011. The 38% increase was mainly attributable to delays encountered by shipments transported by road. Among the six CAREC corridors, the time to cross a BCP along corridors 1, 2, and 4 has increased. On these corridors, crossing a BCP required more than 10 hours on average. Along corridor 1, CPMM documented a substantial increase in time to cross both road and rail BCPs. Data gathered during the first quarter of 2012 reveal longer processing times when entering Kazakhstan BCPs, specifically from Ala shankou and Khorgos. Similarly, a significant decrease in time to cross a BCP observed in 2011 was attributed to shipments crossing Kazakhstan-Russia BCPs along corridor 1 when the Kazakhstan–Russia– Belarus Customs Union came into effect. Consistent with previous years, an increase in time was observed when crossing a rail BCP along corridor 4 where delays have been attributed to change in railway gauge, loading/ unloading, and waiting time.

- Corridor 1 suffered the most delays at Dostyk-Alashankou (KAZ-PRC) and Khorgos-Khorgos (KAZ-PRC).
- Corridor 4 suffered from serious delays in rail transport at Erenhot-Zamyn Uud (PRC-MON) due to change in railway gauge when entering the opposite side of the border.
- In Corridor 5, trucks were held up at Irkeshtan (PRC) due to adverse weather and at Karamik (KGZ) because of temporary closure of the border to transit shipments.





Road Transport

In 2012, the average time to cross a road BCP slightly increased (by 12% from 2011) to 8.9 hours. However, the median estimates remained at 4.1 hours. These divergent values indicate that the rare data characteristics or outlier samples which exhibited extremely long delays have caused the average value to be skewed. This was the case in the two BCPs along sub-corridor 1a in Ala Shankou and sub-corridor 1b in Khorgos. Truck drivers waited long hours at these PRC borders to enter Kazakhstan during the first quarter of 2012. The estimated average time to cross a road BCP along corridor 1 doubled as a result–from 6.2 hours in 2011 to 12.4 hours in 2012. Consequently, the estimated speed with delay along sub-corridor 1b was also lower than most of the sub-corridors during the same period. This demonstrates that outlier samples showing significant delays at the BCP affect other indicators negatively, especially TFI4, since delays at BCPs were accounted for in the computation of speed.

Rail Transport

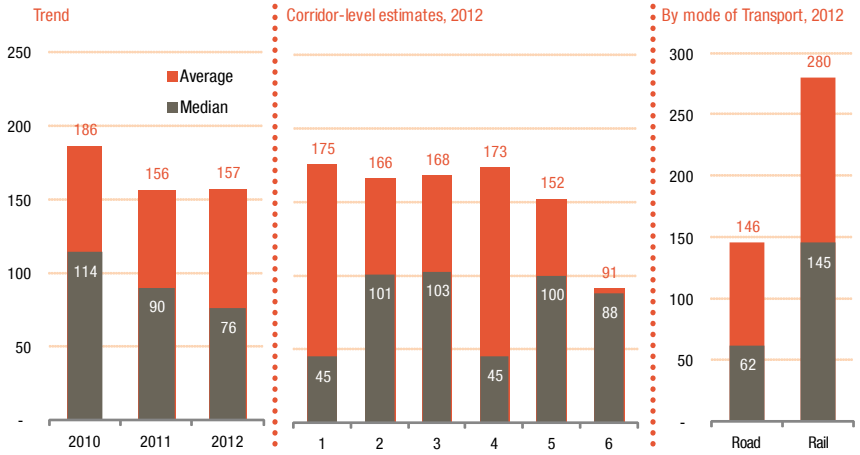
The estimated average time to cross a rail BCP increased from 22.3 hours in 2011 to 24.7 hours in 2012. Moreover, the median values increased significantly: from 12 hours in 2011 to 24 hours in 2012. Major delays were observed along sub-corridors 1a and 4b, where the average time to cross a rail BCP exceeded 20 hours. The identified key bottlenecks along these sub-corridors were at BCP pairs Alashankou (PRC)–Dostyk (KAZ), Erenhot (PRC)–Zamyn Uud (MON), and Nauskhi (RUS)–Sukhbaatar (MON). The average time along the other sub-corridors, however, did not exhibit significant change.

TFI2 Cost Incurred at Border Crossing Clearance

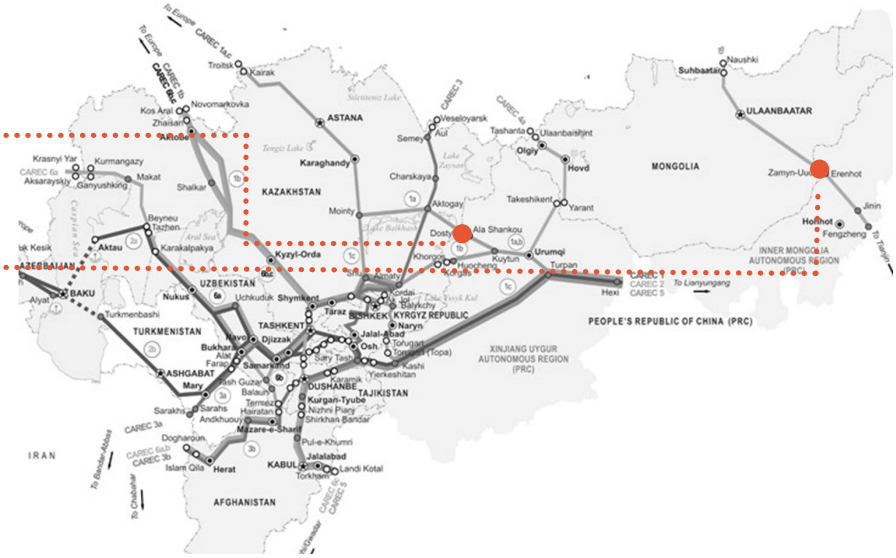
(in $)

The overall average cost incurred at border crossing clearance was relatively unchanged: from $156 in 2011 to $157 in 2012. The mean cost spent at a road border crossing clearance remained the same and minimal increase in the average cost to cross a rail BCP was observed. Among the six CAREC corridors, the cost to cross a BCP along corridors 1 and 4 was higher.

Meanwhile, the median values continue to decrease (by 18% from 2011 to 2012) since 2010. Although train shipments encountered an increase in cost from 2011 to 2012, the road data, which accounts for bulk of the samples, indicated no significant change in the cost to cross a BCP.



- Dostyk-Ala Shankou (KAZ-PRC),along Corridor 1, remained the most expensive BCPs to cross per crossing when entering the opposite side of the border.
- Samples show that customs clearance fees at Dostyk are expensive in comparison with other BCPs. Other samples indicate high costs in change of railways gauge.
- Zamyn-Uud (MON) is particularly expensive due to high customs clearance cost.



Road Transport

In 2012, truck shipments incurred $146, on average, to cross a border. The highest average cost incurred to cross a BCP observed in 2012 was along corridor 4 at $172, followed by the cost incurred along corridor 3 estimated at $168 and along corridor 2 at $166. The high cost of crossing a BCP observed in sub-corridor 4b was mainly attributed to the costly customs clearance fee at BCPs in Mongolia, particularly at Zamyn Uud and Altanbulag. The average cost to cross the Zamyn Uud BCP was $817 and cost was about $336 to cross the Altanbulag BCP.

Sub-corridor estimates showed that the cost incurred to cross a BCP along sub-corridors 2b and 3a were the most expensive. Customs clearance fees were observed to be costly at the following BCP pairs: Alat (UZB)–Farap (TKM), Artik (TKM)–Lytfabad (IRN), and Konysbaeva (KAZ)–Yallama (UZB). Further, the increase in cost of escort or convoy and emergency repairs at Konysbaeva and the expensive road tolls at Artik-Lytfabad were identified to have caused the increase in the estimated cost to cross these BCPs.

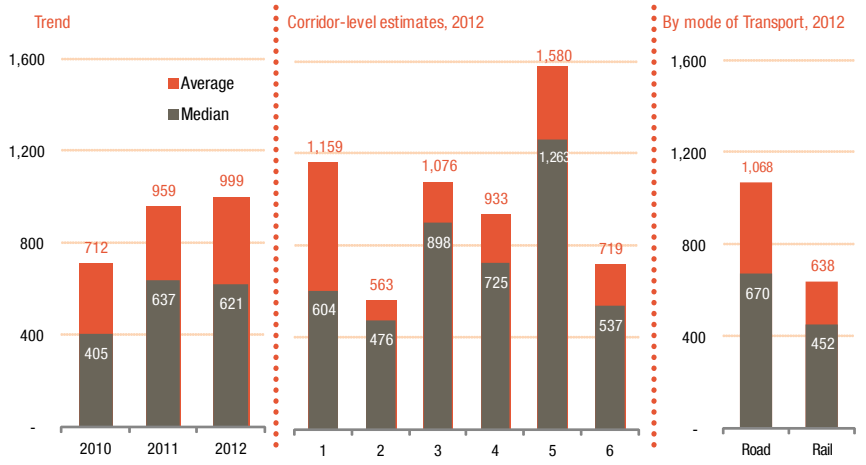
Rail Transport

The overall average cost incurred at rail border crossing clearance increased from $223 in 2011 to $280 in 2012. Among the six CAREC corridors, higher average cost was observed at BCPs along corridors 1 and 4. Along sub-corridor 1a, samples showed that customs clearance fees accounted for the high cost of clearance at Dostyk BCP, which is more expensive than other BCPs. Other samples attributed the high cost of crossing a BCP to change of gauge. Along sub-corridor 4b, the high cost was attributed to costly activities such as loading/unloading and change of gauge. The average cost ($176) to cross a BCP along sub-corridor 4b, however, showed significant improvement (by 21%) when compared with 2011.

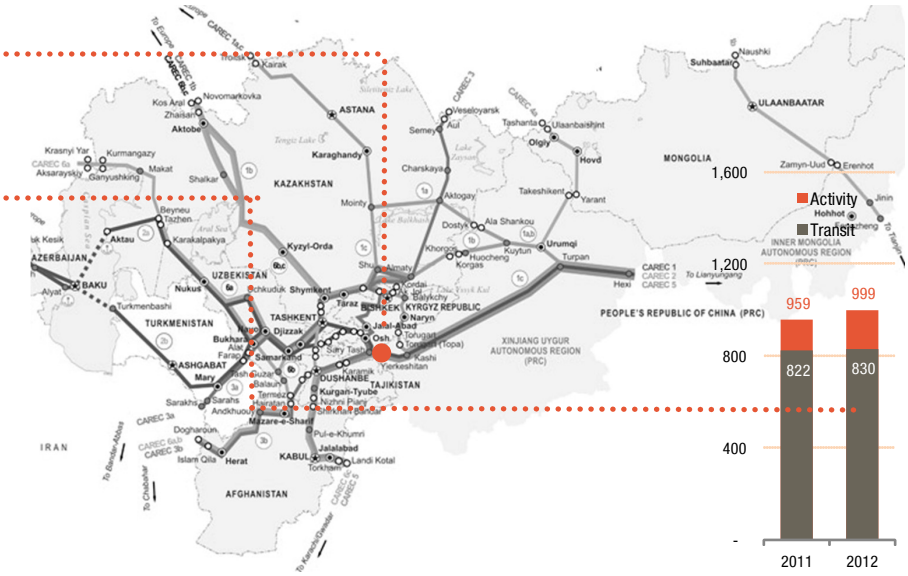
TFI3 Cost Incurred to Travel a Corridor Section

(in $, per 500 km, per 20-ton)

In 2012, the overall average cost incurred to transport a 20-ton cargo over a 500 km corridor section increased slightly (from $959 in 2011 to $998 in 2012). On the other hand, the median estimates decreased from $637 in 2011 to $620 in 2012. The cost to travel a corridor section has been increasing marginally since 2010. However, these increases are attributed primarily to vehicle operating costs (mainly fuel cost and driver's salary).



- Corridor 5 remained to be the most expensive corridor attributed to the difficult terrain and security issues that drivers encounter along the corridor.
- Though the indicator rose in 2012, cost structure reveals that activity cost increased while transit cost (vehicle operation cost, drivers' salary, fuel) remained relatively constant. Apparently, TFI1's deterioration in 2012 affected TFI3.



Road Transport

The average cost to travel a road corridor section increased slightly (from $1,055 in 2011 to $1,068 in 2012). The 2012 and 2011 estimates were consistent–the most expensive road sections to travel were along corridors 1, 4, and 5; the highest estimated average cost of $1,580 was along corridor 5. Among the six corridors, however, the highest increase in the average cost to travel a road section (from $909 in 2011 to $1,234 in 2012 which contributed greatly to the increase in the overall indicator estimate) was along corridor 1. The data were reported by truck drivers travelling along sub-corridor 1b. On the other hand, the average cost to travel a road corridor section along corridors 2, 4, and 6 decreased.

Rail Transport

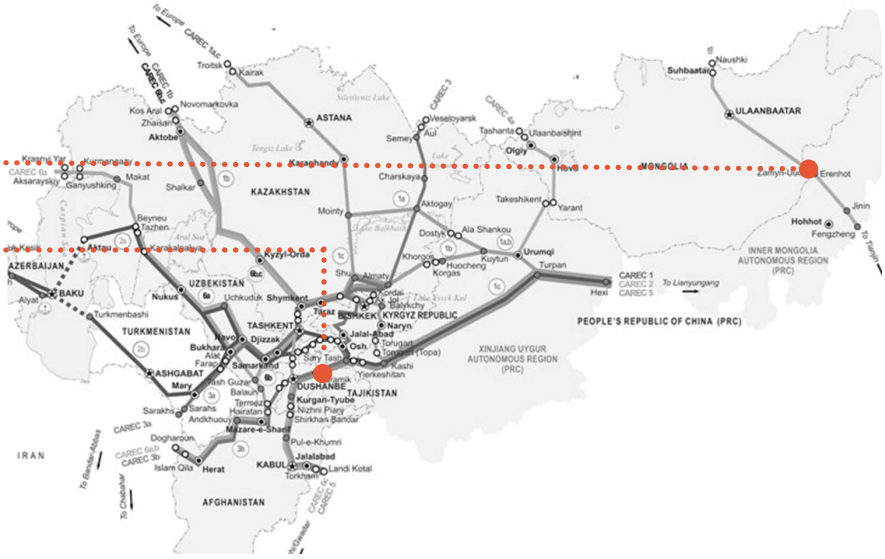
The average cost to travel a rail corridor section per 20-ton cargo increased from $503 in 2011 to $638 in 2012. The estimated increase in the average cost along corridors 1, 2, and 3 were observed specifically in the sections along sub-corridors 1a, 1b, 2a, and 3a. The significant increases in cost – about 2 to 2.5 times – along these corridors greatly affected the overall indicator. Meanwhile, the cost to travel a rail section along corridors 4 and 6 decreased.

TFI4 Speed to Travel on CAREC Corridors

(in kilometers per hour)

TFI4 measures speed with delay (SWD) and speed without delay (SWOD) recorded on CAREC corridors. SWD accounts for border crossing time in the computation. Hence, SWD also reflects border crossing efficiency. There was a modest improvement in the overall average SWD observed–from 21.9 kph in 2011 to 22.9 kph in 2012. Among the six corridors, the average SWD of 12.2 kph observed along corridor 4 was the slowest estimated speed in 2012.

SWOD, however, disregards border crossing time. SWOD measures speed on a 500 km corridor section and is an indication of the quality of transport infrastructure. In 2012, the overall average speed to travel a corridor without delay at BCPs was almost the same as the SWOD estimated in 2011 but this SWOD showed improvement compared to 2010.



- Corridor 4 continued to be the slowest corridor, both in road and rail transport.
- Next slowest was Corridor 5 due mainly to the topography of the roads. Security risks in certain areas required escort/convoys that added to delay
- Data reveals that TFI1's deterioration in 2012 affected SWD estimates for Corridors 1 and 2. However , improvements in SWD in other corridors offset this decline.

Road Transport

Both in 2011 and 2012, higher average SWOD were observed along corridors 1, 2, and 3, suggesting improved physical infrastructure. On the other hand, SWD along corridor 5 is still the lowest. Most corridors suffered a drop of 50% in speed when border crossing time was included.

Rail Transport

In 2012, the average train SWOD did not vary from 2011. Along corridor 4, however, train speeds were observed to be slower. The significant decrease recorded in the average train SWD was attributed to stoppage activities such as change in gauge, waiting time in queue (passenger traffic is prioritized at the expense of freight), and classification at marshaling yards, which consumes a great deal of time.

IV. CPMM Results

This section describes in detail the speed, time, and cost factors influencing freight flows within CAREC, including the variability and reliability of these key indicators and corridor and sub-corridor estimates. Further, the activities that caused extreme delays and cost increases to cross specific BCPs are identified.

A. Speed

Road Transport

The average SWOD of trucks along CAREC corridors varied from 33 kph to 47 kph, which is close to the range of speed observed in 2010 (32 kph to 55 kph) and 2011 (31 kph to 52 kph). Consistent with 2011 estimates, the highest average speed observed in 2012 was along corridor 3; corridor 5 registered the slowest average speed. At the sub-corridor level, the average SWOD ranged between 33 kph and 55 kph. Sub-corridors 1a and 1b recorded the fastest speed averages, followed by sub-corridor 3a. Moreover, average estimates for SWD tell a similar story. At the corridor level, SWD ranged between 17 kph and 28 kph. The highest speed was observed in corridors 1 and 6; the slowest average speed was observed along corridor 5. Along the sub-corridors, SWD ranged between 17 kph and 41 kph. The fastest SWD was along sub-corridor 1a and slowest along corridor 5.

Some findings observed in 2011 were consistent with 2012. Sub-corridor 1a continued to record the fastest SWOD and SWD estimates while corridor 5 remained the slowest both in terms of SWOD and SWD. Policymakers of CAREC countries may wish to use CPMM information to prioritize and focus their efforts on improving problematic corridors and BCPs to benefit from international trade. For instance, the Cross Border Transport Agreement (CBTA)[9] between the Kyrgyz Republic and Tajikistan, once it enters into force, is expected to reduce the time and cost for vehicles crossing BCPs along corridor 5. CPMM data analysis can inform deliberations on how to improve CBTA implementation over time.

Aside from corridor 5, CPMM reveals other underperforming corridor sections. The table enumerates the sub-corridors that recorded the lowest SWOD, lowest SWD, and largest decrease in speed in 2012.

Comparison	Sub-Corridors
Lowest SWOD	5, 4b, 6c
Lowest SWD	5, 6b, 4b
Largest decrease in speed	6b, 1b, 3a

Sub-corridors 4b and 6b had relatively low SWD estimates. Slow speed along sub-corridor 6b was attributed to the long (as many as 7 days) delay experienced by drivers in Dushanbe waiting for issuance of a special permit to transport goods to Afghanistan.

The corridor and sub-corridor estimates for road shipments revealed that the slowest average SWOD and SWD was observed along corridor 5 where significant delays occurred at Irkehstan (PRC)–Irkeshtan (KGZ) and Karamyk (KGZ)–Karamyk (TAJ) BCPs. The unfavorable condition in road transport along corridor 5 needs attention. Among its four distinct sections along Afghanistan, PRC, the Kyrgyz Republic, and Tajikistan, travelling through Tajikistan is noticeably slower with speed ranging between 30 to 40 kph. Meanwhile, the observed slow speed along corridor 4 was caused by harsh weather conditions, poor road networks, and lack of logistics facilities.

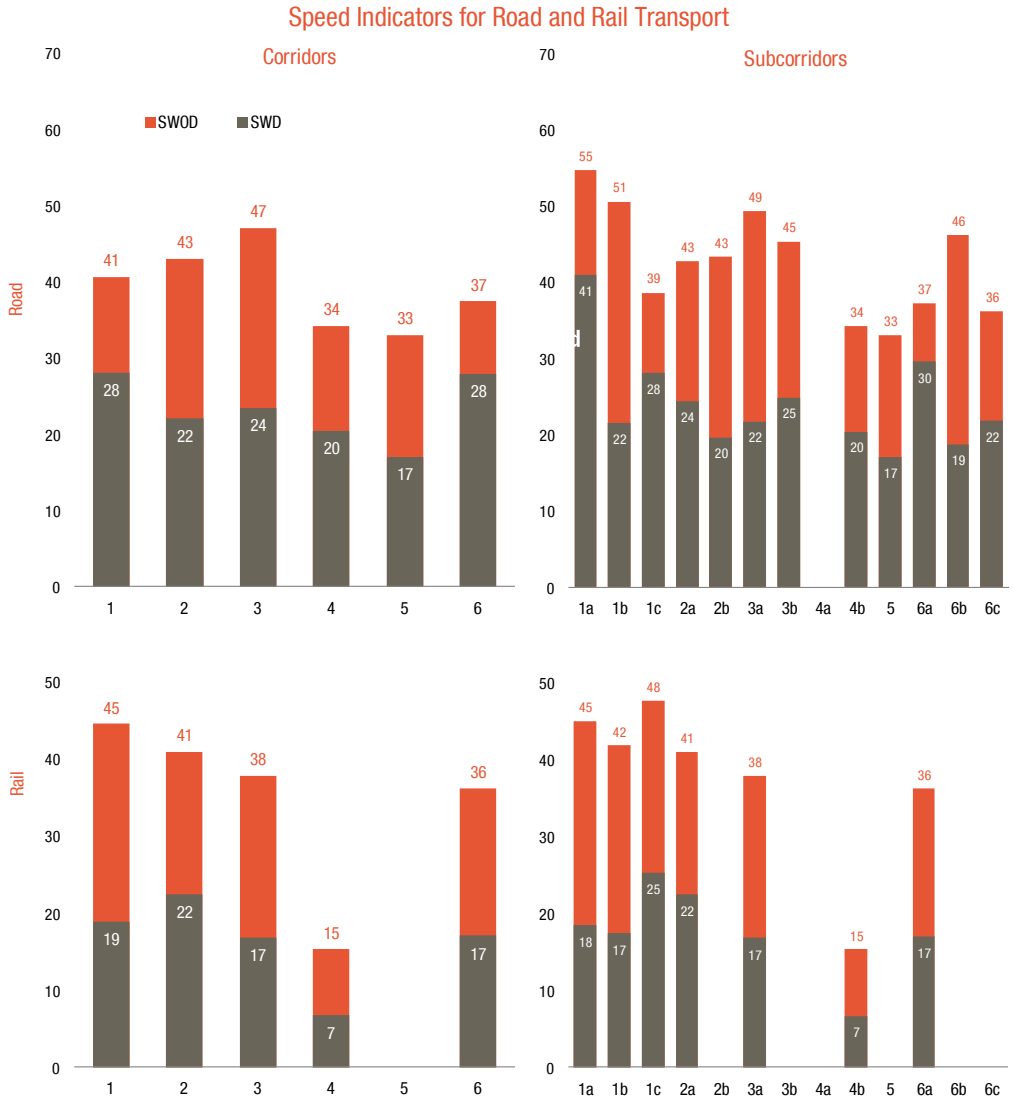
Rail Transport

SWOD estimates on CAREC railways ranged from 15 kph to 45 kph while SWD ranged from 7 kph to 22 kph. SWOD increased slightly from 2011 (11 kph to 38 kph) while 2012 SWD is comparable to 2011 (7 kph to 25 kph). Further, train SWOD along corridor 1 was the fastest while corridor 4 experienced the lowest average speed. However, when delays and other stop activities are accounted, corridor 2 recorded a faster SWD than corridor 1.

Since 2010, estimates of speed along corridor 4 have been the lowest in both SWD and SWOD. Low SWOD is attributed to slow movement of wagons within Mongolia, especially in the Zamyn Uud–Sainshand–Choyr and Ulaanbaatar sectors. On the other hand, the three primary causes of low SWD reported are: (i) long waiting time at the Tianjin Xingang seaport–imports bound for Ulaanbaatar or exports to Yokohama, Japan or Pusan, Korea usually wait 5-7 days at the seaport for clearing, (ii) change of gauge at Erlian (PRC)–Zamyn Uud (MON) BCPs, and (iii) lack of locomotives and rail wagons at Sainshand and Choyr terminals caused long waiting time.

CPMM estimates undescore the advantages of transporting along corridor 1. Shipments along corridor 1 travelled faster compared to

9 The Cross Border Transport Agreement (CBTA) was the first agreement facilitated under the CAREC framework, signed by the Kyrgyz Republic and Tajikistan in December 2010. The CBTA objective is to cut down the border crossing time for cargoes and passengers through the designated BCPs. By streamlining customs procedures and bypassing the need to trans-load vehicles, border crossing could be more efficient.



- **Speed Without Delay (SWOD), in kph.** This metric considers travelling speed only, i.e. when the delivery truck moves on the road, or when the train moves on the tracks. When the vehicle is stationary, the time is not counted.
- **Speed With Delay (SWD), in kph.** This SWD considers the total time taken for the entire journey, including stoppage time due to the various reasons.

other corridors both in terms of SWOD and SWD. Along the sub-corridors, rail speed along all three sub-corridors in corridor 1 registered an average SWOD of more than 40 kph which are quite remarkable as they compare even to road speed averages. However, average SWD along corridor 1 for rail was lower compared to road transport. The time spent for change of gauge and classification of trains caused long delays in key railway terminals, producing low SWD. Further development of corridor 1, a key element in the new Euro-Asian land bridge that presents an alternative to Russia's Trans -Siberian corridor, may provide new opportunities for CAREC economies. In addition, corridor 1 also circumvents the problem of multiple border crossing observed in corridors 2 and 3.

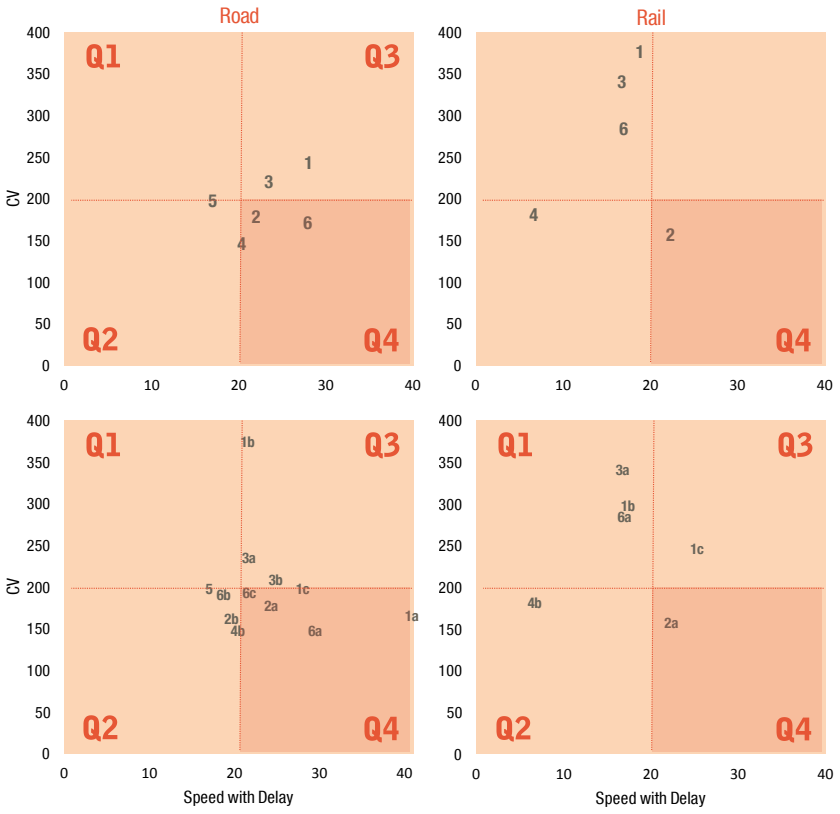
Variation in Sample

Shippers are concerned not just with the average speed: the reliability of arrival time of goods is just as much a concern. If the delivery of a shipment cannot be predicted accurately, travel time and mode of transport of goods (especially for perishables) need to be carefully studied. If a corridor exhibits highly unpredictable shipment duration in the past, shippers and/or drivers will consider other corridors and routes in instances where other options are available. Unreliable transportation tends to cause higher transportation and inventory carrying costs that drive up the cost of goods sold. Unless the carrier has a reliable track and trace solution, shippers should plan the route ahead of time, especially for time-

Speed reliability plot

- **Quadrant 1:** Low Speed, High CV. This is very challenging for shipment because the vehicles move slowly, and uncertainty in lead time is high.
- **Quadrant 2:** Low Speed, Low CV. Shipment moves slowly along this quadrant, although the delivery lead time is more consistent. The key is to increase the speed (e.g. by constructing a new road).
- **Quadrant 3:** High Speed, High CV. Shipment moves fast in this quadrant. However, the uncertainty in this quadrant is high, which means the actual arrival may be earlier or later than the expected time of arrival. The reasons for such outcomes need to be investigated and the variations of the timings need to be reduced. For instance, inconsistent border inspection practices make it hard to predict when the cargoes can be cleared.
- **Quadrant 4:** High Speed, Low CV. This is the ideal situation because goods can move rapidly and reliably. The objective of CPMM is to improve the performance in Quadrants 1, 2 and 3 so that they can move to this quadrant over time.

Variation in Speed Estimates per Corridor



sensitive commodities. For instance, the Tajikistan Chamber of Commerce and Industry organized a trade fair in 2012 showcasing Iranian goods, but the cargoes from Iran failed to arrive as scheduled due to railway delays in a transit country. This resulted in significant revenue losses.

CPMM uses coefficient of variation (CV) values to evaluate corridor transport reliability. CV is derived by dividing the standard deviation over the average of any given indicator. By definition, a high CV is undesirable as arrival times are more unpredictable. To determine the reliability of delivery time, CV's of SWD estimates are compared across corridors and sub-corridors, accounting for both travel time and delays in the comparison. As higher CV indicates data volatility and less predictability, smaller values are preferred. Further examination of the sub-corridors shows more detailed information.

For road transport, corridors 1 and 6 appear to be faster. However, corridor 6 had lower CV. Meanwhile, corridor 5 is less desirable since it lagged behind all other corridors in terms of speed and features comparatively high CV. Sub-corridor 1a had the fastest speed with a relatively low CV; sub-corridor 1c was quite fast and reliable as well. However, the good performance of sub-corridors 1a and 1c was negatively affected by the slow speed and very unpredictable transport time along sub-corridor 1b. On the other hand, speed estimates in sub-corridors 6a, 6b, and 6c were more consistent, making it a more preferable route compared to corridor 1.

For rail transport, corridor 2 proved best among other corridors with fast speed and low CV. While speed estimates in corridors 1, 2, 3, and 6 were comparatively similar, corridor 2 outperformed the rest in terms of speed predictability. As previously mentioned, corridor 4 still lagged behind, even with low CV. Sub-corridor 2a proved to be superior while the rest were either too slow (sub-corridor 4b) or too volatile (sub-corridors 1b, 1c, 3a, and 6a).

B. Delays at Border Crossing Points

A key objective of studying CPMM data is to understand what causes major delays and impediments during border crossing. Much effort was expended on data collection to record the time spent at BCPs by drivers and freight forwarders. CPMM enumerates the most common activities encountered by drivers and rail operators during border crossing and measure the extent of delay each of these activities contribute to the total. Road and rail samples are aggregated separately to present a more accurate assessment. In the table, 'count' shows how often each activity is reported and 'average' refers to the average duration of each activity. These two measures–count and average–are used to give a complete picture on the extent of the effect of BCP delays on speed. A frequently encountered delay may not necessarily add up to a significant impediment. For instance, it is common that road drivers are stopped at police checkpoints but data show that this delay did not significantly prolong shipment time. On the other hand, emergency repair does not occur frequently but typically adds substantially to transport time. Thus, stop activities that have a high count and a high average should be monitored closely since they are major causes of delays.

Road Transport

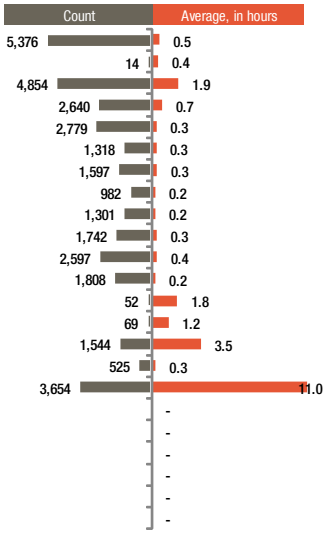
The top five most commonly encountered (by frequency) activities for road transport were:

1. Border security/control
2. Customs clearance
3. Waiting in queue
4. Phytosanitary
5. Health/quarantine

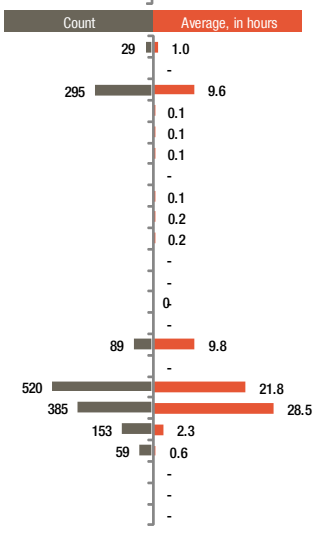
Meanwhile, the top five most time-consuming activities (by average time) for road transport were:

Duration of Actvities spent on BCPs

	Count							Average, in hours						
		Corridors							Corridors					
Road	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Border Security / Control	5,376	1,555	734	646	1,020	517	904	0.5	0.3	0.8	0.8	0.3	0.5	0.7
B. Customs (Single Window)	14	-	14	-	-	-	-	0.4	-	0.4	-	-	-	-
C. Customs Clearance	4,854	1,159	785	657	1,006	515	732	1.9	2.3	1.3	1.1	3.4	0.9	1.1
D. Health / Quarantine	2,640	672	360	390	702	193	323	0.7	1.3	0.3	0.4	0.4	0.7	1.0
E. Phytosanitary	2,779	485	336	436	1,008	128	386	0.3	0.2	0.3	0.3	0.3	0.3	0.5
F. Veterinary Inspection	1,318	361	178	224	438	20	97	0.3	0.1	0.2	0.3	0.5	0.2	0.3
G. Visa/Immigration	1,597	601	124	191	414	239	28	0.3	0.2	1.2	1.1	0.1	0.2	0.3
H. GAI/Traffic Inspection	982	266	19	68	330	114	185	0.2	0.2	0.3	0.2	0.3	0.1	0.3
I. Police Checkpoint / Stop	1,301	331	313	222	107	43	285	0.2	0.1	0.2	0.2	0.5	0.1	0.2
J. Transport Inspection	1,742	700	193	324	-	77	448	0.3	0.2	0.4	0.4	-	0.2	0.4
K. Weight/Standard Inspection	2,597	811	413	409	576	70	318	0.4	0.2	0.5	0.4	0.2	0.3	0.5
L. Vehicle Registration	1,808	289	224	104	1,014	87	90	0.2	0.2	0.4	0.4	0.2	0.1	0.4
M. Emergency Repair	52	21	3	5	-	1	22	1.8	0.8	3.1	4.8	-	4.0	1.8
N. Escort / Convoy	69	4	-	5	6	33	21	1.2	0.6	-	0.4	0.5	1.8	0.6
O. Loading / Unloading	1,544	185	57	62	536	375	329	3.5	4.7	5.0	3.4	5.0	1.9	1.8
P. Road Toll	525	6	92	19	303	68	37	0.3	0.8	0.6	0.4	0.1	0.2	0.2
Q. Waiting/ Queue	3,654	1,132	650	505	553	224	590	11.0	15.3	11.1	6.2	1.0	21.8	11.8
R. Change of Railways Gauge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Classification of Trains	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T. Technical Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U. Commercial Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
V. Load Protection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W. Security Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Rail	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Border Security / Control	29	23	-	4	-	-	2	1.0	1.1	-	0.9	-	-	1.2
B. Customs (Single Window)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. Customs Clearance	295	193	1	12	89	-	-	9.6	4.1	2.1	1.5	22.7	-	-
D. Health / Quarantine	1	1	-	-	-	-	-	0.1	0.1	-	-	-	-	-
E. Phytosanitary	1	1	-	-	-	-	-	0.1	0.1	-	-	-	-	-
F. Veterinary Inspection	1	1	-	-	-	-	-	0.1	0.1	-	-	-	-	-
G. Visa/Immigration	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H. GAI/Traffic Inspection	1	1	-	-	-	-	-	0.1	0.1	-	-	-	-	-
I. Police Checkpoint / Stop	1	1	-	-	-	-	-	0.2	0.2	-	-	-	-	-
J. Transport Inspection	1	1	-	-	-	-	-	0.2	0.2	-	-	-	-	-
K. Weight/Standard Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. Vehicle Registration	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. Emergency Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. Escort / Convoy	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O. Loading / Unloading	89	2	3	-	84	-	-	9.8	5.0	5.3	-	10.1	-	-
P. Road Toll	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q. Waiting/ Queue	520	212	-	3	303	-	2	21.8	21.8	-	5.1	22.1	-	5.9
R. Change of Railways Gauge	385	107	-	-	278	-	-	28.5	4.9	-	-	37.5	-	-
S. Classification of Trains	153	114	11	15	-	-	13	2.3	2.2	2.6	2.7	-	-	2.4
T. Technical Inspection	59	56	3	-	-	-	-	0.6	0.6	0.4	-	-	-	-
U. Commercial Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
V. Load Protection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W. Security Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Legend: More than 1 hour

1. Waiting in queue
2. Loading/unloading
3. Customs clearance
4. Emergency repair
5. Escort/convoy

The same commonly encountered and time-consuming activities were reported in 2011, but the ranking of each activity differs slightly from 2012.

To implement changes, policymakers must identify the activities that occur most frequently and consume the most time. CPMM results identified delays due to 'waiting in queue' as more severe than other activities–ranked third by frequency and first in terms of average duration. On average, truck drivers waited for as long as 11 hours simply to enter a BCP. According to CPMM data, 4 out of 6 corridors had an average waiting time of more than ten hours at the BCP. The situation is most severe for drivers travelling along corridor 5, where waiting in queues takes as long as 22 hours on average.

Digging deeper, however, it becomes clear that extreme delays at just a handful of BCPs distort the overall impression of BCP (in) efficiency.

Comparing the average duration of each activity, 4 of the top 5 most time-consuming activities had similar values in 2011 and 2012, with the exception of waiting time in queue at BCPs. In 2012, the average waiting time doubled from 5.5 hours to 11 hours. During the year, all corridors experienced an increase in waiting time, producing a higher overall average in 2012. Reasons vary from one corridor to another and partly explain the observed increase in TFI1. In the succeeding sections, a closer and deeper examination of the data identifies which BCPs contributed to the increased waiting time in queues at the borders.

Rail Transport

The causes of delays in rail transport were concentrated and limited to a shorter list of activities compared to road transport. However, the average duration of each delay is higher compared to road transport. The top three most commonly encountered (by frequency) activities for rail transport were:

1. Waiting in queue
2. Change of gauge
3. Customs clearance

Meanwhile, the top three most time-consuming delays (by average time) for rail transport were:

1. Change of gauge
2. Waiting in queue
3. Loading/unloading

The same commonly encountered and time-consuming activities were reported in 2011 with minor differences in the ranking of each activity.

Unlike road transport, the average delay for rail in 2012 showed slight reduction for the top three activities compared to 2011. Among these activities, change of gauge procedures averaging 29 hours accounts for the bulk of delays encountered at rail BCPs. The long duration experienced in changing gauge, together with waiting time to undergo border formalities, together explain the delays encountered at BCPs along corridors 1 and 4.

C. Cost

This section examines the expenses related to stoppage activities. Drivers were asked to report any activity that required payment, whether official or unofficial, and track incurred expenses along each section of the corridor.

Road Transport

The top five most commonly encountered (by frequency) activities that required payments were:

1. Border security/control
2. Customs clearance
3. Health/phytosanitary
4. Vehicle registration
5. Transport inspection

On the other hand, the top three most costly (amount in $) activities were:

1. Customs clearance
2. Escort/convoy
3. Emergency repair

Payments made for these three activities averaged more than $100 each. It must be noted, however, that escort/convoy services and emergency repairs are activities rarely registered during the conveyance of goods in CAREC. Payments for escort/convoy services were mostly encountered by shipments along corridors 5 and 6, while several instances of emergency repair happened along corridors 3 and 6. Thus, in terms of frequency and amount of

payment, shipment cost was mostly affected by the customs clearance fees.

Rail Transport

The top five most commonly encountered (by frequency) activities that required payments were:

1. Change of gauge
2. Loading/unloading
3. Customs clearance

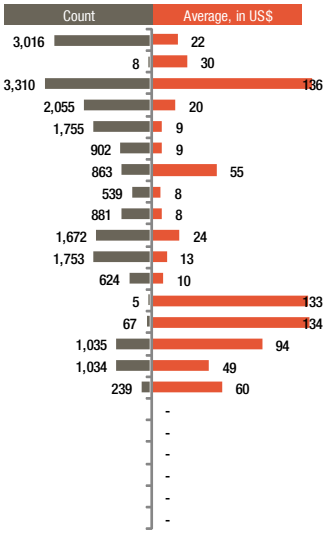
Meanwhile, the top three most costly (amount in $) activities were:

1. Customs clearance
2. Change of gauge
3. Loading/unloading

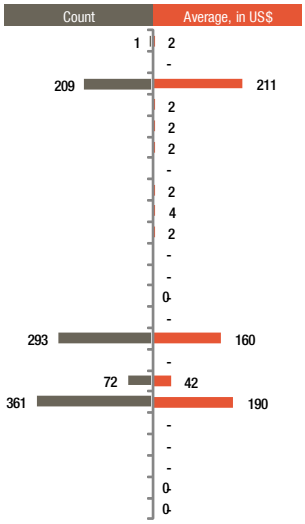
Currently, the CPMM only collect rail data from partner associations in Kazakhstan and Mongolia. Therefore, costs were recorded in two corridors–1 and 4. In 2013, efforts will be initiated to collect a wider sample of railway data for CPMM by identifying and engaging partner associations with regular access to detailed data on shipments by rail.

Cost of Actvities spent on BCPs

	Count							Average, in US$						
		Corridors							Corridors					
Road	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Border Security / Control	3,016	1,071	423	507	-	436	579	22	20	19	18	-	22	30
B. Customs (Single Window)	8	-	8	-	-	-	-	30	-	30	-	-	-	-
C. Customs Clearance	3,310	1,000	416	516	440	500	438	136	110	44	56	491	111	51
D. Health / Quarantine	2,055	615	260	352	441	193	194	20	37	9	15	18	7	11
E. Phytosanitary	1,755	406	171	354	472	124	228	9	7	10	11	6	5	14
F. Veterinary Inspection	902	308	94	201	210	20	69	9	6	9	13	8	4	8
G. Visa/Immigration	863	327	130	187	-	192	27	55	13	84	150	-	21	15
H. GAI/Traffic Inspection	539	248	17	64	15	59	136	8	7	16	8	3	3	9
I. Police Checkpoint / Stop	881	304	143	138	107	43	146	8	6	5	6	26	4	5
J. Transport Inspection	1,672	657	188	311	-	77	439	24	18	46	23	-	18	25
K. Weight/Standard Inspection	1,753	767	257	301	210	68	150	13	12	13	18	7	8	13
L. Vehicle Registration	624	264	118	85	6	87	64	10	10	7	11	5	11	14
M. Emergency Repair	5	-	-	3	-	-	2	133	-	-	217	-	-	8
N. Escort / Convoy	67	8	-	5	-	33	21	134	411	-	219	-	109	47
O. Loading / Unloading	1,035	141	1	12	220	365	296	94	207	425	5	45	83	91
P. Road Toll	1,034	3	123	34	744	68	62	49	92	198	296	4	127	69
Q. Waiting/ Queue	239	145	1	1	-	92	-	60	80	10	211	-	27	-
R. Change of Railways Gauge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Classification of Trains	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T. Technical Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U. Commercial Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
V. Load Protection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W. Security Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Rail	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Border Security / Control	1	1	-	-	-	-	-	2	2	-	-	-	-	-
B. Customs (Single Window)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. Customs Clearance	209	209	-	-	-	-	-	211	211	-	-	-	-	-
D. Health / Quarantine	1	1	-	-	-	-	-	2	2	-	-	-	-	-
E. Phytosanitary	1	1	-	-	-	-	-	2	2	-	-	-	-	-
F. Veterinary Inspection	1	1	-	-	-	-	-	2	2	-	-	-	-	-
G. Visa/Immigration	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H. GAI/Traffic Inspection	1	1	-	-	-	-	-	2	2	-	-	-	-	-
I. Police Checkpoint / Stop	1	1	-	-	-	-	-	4	4	-	-	-	-	-
J. Transport Inspection	1	1	-	-	-	-	-	2	2	-	-	-	-	-
K. Weight/Standard Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. Vehicle Registration	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. Emergency Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. Escort / Convoy	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O. Loading / Unloading	293	-	-	-	293	-	-	160	-	-	-	160	-	-
P. Road Toll	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q. Waiting/ Queue	72	72	-	-	-	-	-	42	42	-	-	-	-	-
R. Change of Railways Gauge	361	81	-	-	280	-	-	190	619	-	-	66	-	-
S. Classification of Trains	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T. Technical Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U. Commercial Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
V. Load Protection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W. Security Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Legend: More than US$100

CPMM ANNUAL REPORT

Duration and Cost of Activities spent on Top 10 CAREC BCPs (based on 2012 sample)

Road Transport

Duration (hrs)

	BCP	Country	Count	Total Average	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Kordai	KAZ	294	3.9	3.8	0.2		0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1		1.0	5.7	1.5	3.3
	Ak Zhol	KGZ	288	2.8	2.9	0.2		0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1		0.2	6.0		2.3
	Kairak	KAZ	145	1.5	1.0	0.3		1.0	0.2	0.2	0.2	0.3	0.2	0.3	0.4	0.2	0.3					1.3
	Troitsk	RUS	145	1.5	0.8	0.3		1.1	0.2	0.2	0.2		0.2	0.3	0.4	0.3						1.4
	Torugart	PRC	131	18.4	5.3	0.2		1.9	3.0	0.2	0.2	0.2		0.1		0.1	0.2			11.9		24.5
	Khorgos	PRC	129	65.0	31.0	0.2		5.4	5.4	1.5	0.3	0.2				0.5	5.4	0.3		2.9	0.1	64.2
	Khorgos	KAZ	121	17.3	12.3	0.3		10.9	0.2	0.2	0.2	0.2			0.4	0.3		0.4		5.3		12.3
	Merke	KAZ	79	2.4	1.3	0.3		0.7	0.1	0.1	0.1	0.3	0.3	0.1	0.3	0.3	0.1	1.0				4.0
	Petuchovo	RUS	75	2.1	0.8	0.3		1.6	0.2	0.2	0.2		0.1	0.1	0.3	0.2	0.3	0.3		6.0		2.2
	Torugart	KGZ	66	4.1	4.8	0.5		0.5	1.3	0.2	0.1	0.1		0.1	0.1	0.2	0.1					3.4
2	Farap	TKM	142	8.0	7.0	0.7		1.1	0.3	0.3	0.3	0.7	0.2	0.2	0.5	0.5	0.3				0.4	5.0
	Alat	UZB	141	7.0	5.3	0.6		1.0	0.3	0.4	0.2	2.0	0.2	0.2	0.4	0.6	0.4	3.8				4.4
	Tazhen	KAZ	121	29.7	8.7	0.8		1.6	0.3	0.3	0.3	0.5	0.3	0.5	0.6	0.4	0.6			3.0		30.4
	Dautota	UZB	118	14.3	5.9	0.6		1.2	0.3	0.3	0.2	0.3			0.6	0.2	0.4					15.6
	Artik	TKM	75	15.4	8.1	0.6		1.1	0.3	0.3	0.3	0.6		0.2	0.3	0.7	0.4				1.7	12.7
	Sarahs	TKM	64	8.2	5.3	3.1		1.2	0.3	0.2	0.2	0.7		0.2	0.3	0.5	0.4				0.4	2.6
	Suvanobad	UZB	47	3.9	0.3			2.8						0.3						5.2		
	Dustlik	UZB	38	9.5	6.7	0.5		2.5	0.2	0.3	0.2	1.5		0.3	0.3	1.1	0.3			5.3		7.7
	Beyneu	KAZ	32	0.5	0.4								0.3	0.4	0.4							
	Yallama	UZB	21	9.1	8.7	0.5		1.0		0.5				0.2		0.4						6.5
3	Konysbayeva	KAZ	74	7.9	7.0	1.0		1.4	0.6	0.5	0.3	0.9	0.3	0.2	0.6	0.5	0.3	7.8			0.2	4.0
	Yallama	UZB	74	10.0	9.3	0.9		1.5	0.5	0.4	0.3	1.8	0.3	0.2	0.4	0.5	1.5				0.7	6.3
	Farap	TKM	66	11.1	10.2	1.5		1.2	0.4	0.3	0.3	2.6	0.2	0.2	0.3	0.4	0.6	8.0			0.4	7.1
	Alat	UZB	64	10.5	10.0	1.2		1.1	0.4	0.4	0.4	1.2	0.2	0.2	0.4	0.4	0.3				1.0	8.3
	Merke	KAZ	59	5.7	5.3	1.0		0.9	0.4	0.3	0.3	1.1	0.1	0.2	0.4	0.4	0.2					4.0
	Karamik	KGZ	55	6.1	1.8	0.2		0.4	0.2	0.2	0.2	0.2		0.1	0.2	0.2	0.2	0.2		0.9		35.2
	Chaldovar	KGZ	43	5.3	4.9	0.6		0.7	0.3	0.2	0.2	0.1	0.1	0.2	0.4	0.3	0.2					2.9
	Sarasiya	UZB	40	6.6	6.2	0.5		1.0	0.3	0.3				0.2		0.5						4.3
	Taraz	KAZ	34	1.3	0.4								0.2	0.2	0.3					4.3		
	Artik	TKM	30	10.5	10.8	0.7		0.9	0.4	0.4	0.3	1.6	0.3	0.2	0.4	0.4	3.5				0.3	7.4
4	Erenhot	PRC	606	6.0	5.1	0.2		5.0	0.3	0.3	0.4	0.1	0.3	0.3		0.2	0.1			4.7	0.1	0.8
	Zamyn Uud	MON	516	7.2	6.3	0.7		5.7	0.6	0.5	0.6	0.1	0.3	0.8		0.3	0.1			5.3		2.8
	Altanbulag	MON	198	2.4	2.0	0.3		0.6	0.3	0.3			0.3			0.3	0.3			4.8		0.7
	Sukhbaatar	MON	198	1.2	1.3	0.3		0.5	0.3	0.3	0.3		0.3			0.3	0.3					0.5
	Khiyagt	RUS	186	2.5	2.5	0.3		0.5	0.3	0.3			0.3			0.3	0.3		0.5			0.6
5	Sherkhan Bandar	AFG	269	3.0	1.2	0.9		0.4	0.1	0.1		0.1		0.1						2.1	0.2	8.4
	Torkham	AFG	171	2.6	2.1	0.7		0.6						0.1						1.7		
	Karamik	KGZ	103	15.8	3.6	0.3		0.8	0.6	0.5	0.2	0.2	0.2	0.1	0.2	0.3	0.1	4.0	2.0	1.4		26.8
	Karamik	TAJ	96	4.8	5.0	0.2		1.3	0.2	0.1	0.2	0.5	0.1	0.1	0.3	0.3	0.2		1.9	1.3	0.5	3.8
	Irkeshtan	KGZ	55	9.9	6.8	0.5		2.4	1.4			0.2					0.1				0.1	6.6
	Irkeshtan	PRC	55	51.1	3.4	0.1						0.2	0.2									50.7
	Nizhni Pianj	TAJ	55	0.4	0.4	0.1		0.2	0.1	0.1			0.1			0.5			0.5			
	Dusti	TAJ	2	1.0	1.0	0.2		0.3		0.1	0.1	0.1		0.1	0.2		0.2					
6	Dautota	UZB	213	15.7	6.2	0.6		0.9	0.3	0.6	0.3	0.3	0.3	0.1	0.5	0.5	0.5	1.0				15.8
	Tazhen	KAZ	210	19.3	7.3	0.9		1.4	1.6	0.3	0.3	0.6	0.3	0.2	0.5	0.5	0.4	1.0				16.6
	Hairaton	AFG	146	1.9	1.2	0.7		0.6						0.1					3.0	1.4	1.0	10.0
	Beyneu	KAZ	145	0.5	0.3			0.5					0.3	0.3	0.3			1.5				12.0
	Torkham	AFG	128	2.1	2.3	0.8		0.7						0.2						1.1		
	Kurmangazy	KAZ	125	4.1	2.8	0.8		0.5	0.2	0.2	0.2	0.3	0.5	0.3	0.4	1.5	0.5					4.2
	Krasnyi Yar	RUS	50	2.7	1.0	0.6			0.2	0.3	0.2		0.3	0.3	0.5	0.9	0.5	1.0		2.0		6.0
	Konysbayeva	KAZ	49	6.0	6.0	0.8		1.3	0.7	0.9			0.2	0.2	0.6	1.0	0.3					1.7
	Saryagash	KAZ	49	0.3	0.3								0.3	0.2	0.2							
	Istaravshan	TAJ	46	0.1	0.1									0.1	0.2						0.1	

Cost (US$)

	BCP	Country	Count	Total Average	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Kordai	KAZ	294	153	130	22		57	10	8	8	16	13	8	28	19	13		20	0	9	0
	Ak Zhol	KGZ	288	37	34	8		15	4	3	3	5	3	3	4	4	3		11			0
	Kairak	KAZ	145	36	33	34		31	4	4	3	7	11	13	17	13						
	Troitsk	RUS	145	12	9	10		0	5	5	5		10	12	16	17						
	Torugart	PRC	131	108	3	19		97	171	1	6	3		0		19	4			4		5
	Khorgos	PRC	129	482	502	0		129	116			0				11	317			233		89
	Khorgos	KAZ	121	482	500	0		504	4	4	4	0				4						0
	Merke	KAZ	79	80	6	15		87	10	8	8	20	7	6	28	29	24					
	Petuchovo	RUS	75	15	15	14							5	7	17	12						
	Torugart	KGZ	66	41	36	22		4	7	4	7	6		4	4	6	4					2
2	Farap	TKM	142	197	105	11		22	7	8	4	102	4	3	108	13	5				217	
	Alat	UZB	141	162	60	10		53				250	10		15	10	10					
	Tazhen	KAZ	121	169	143	33		91	12	11	10	17	17	12	35	12	13					
	Dautota	UZB	118																			
	Artik	TKM	75	154	60	11		26	6	7	3	72		4	5	12	6			425	234	
	Sarahs	TKM	64	245	293	18		22	9	7		75		3	5	12	11				160	
	Suvanobad	UZB	47																			
	Dustlik	UZB	38	281	250	18		83	11	19	12	190		13	15	30						
	Beyneu	KAZ	32	38	33								14	16	38							
	Yallama	UZB	21																			
3	Konysbayeva	KAZ	74	239	240	28		88	28	21	14	41	9	10	41	28	20	400	500		17	
	Yallama	UZB	74	297	230	21		85	18	14	16	284	10	11	25	16	45				98	
	Farap	TKM	66	303	225	26		48	15	12	7	352	9	8	18	17	45	250			398	
	Alat	UZB	64	209	145	19		75	16	15	38	242	13	10	23	16	19				70	
	Merke	KAZ	59	188	171	20		88	24	14	12	40	8	9	35	28	6					
	Karamik	KGZ	55	49	53	5		23	4	4	4	3		3	8	3	3	2		3		211
	Chaldovar	KGZ	43	78	85	10		33	10	6	5	4	5	5	13	7	5					
	Sarasiya	UZB	40																			
	Taraz	KAZ	34	11	9								9	4	9							
	Artik	TKM	30	275	190	20		39	14	14	14	355	10	10	10	12	200				315	
4	Erenhot	PRC	606	100	45	0		157	8	8	8	0		24		7	0			32	5	
	Zamyn Uud	MON	516	363	15	0		817	28	1	0	0	3	30			0			0	3	
	Altanbulag	MON	198	24	6			336	3	4											3	
	Sukhbaatar	MON	198	3	3					4			4								3	
	Khiyagt	RUS	186																			
5	Sherkhan Bandar	AFG	269	108	100	20		21	8	6		12		4						72	150	2
	Torkham	AFG	171	139	159	31		31						6						98		
	Karamik	KGZ	103	210	42	6		213	5	3	4	9	1	2	5	4	4	0	111	2		21
	Karamik	TAJ	96	292	282	23		180	9	6	3	54	4	4	24	9	31		109		111	0
	Irkeshtan	KGZ	55	269	206	24		222	7			12					4				2	1
	Irkeshtan	PRC	55	23	8	0						0	0									23
	Nizhni Pianj	TAJ	55	58	49	20		32	11	9			3			0			85			
	Dusti	TAJ	2	37	37	2		25		2	2			2	3		2					
6	Dautota	UZB	213																			
	Tazhen	KAZ	210	133	111	25		66	7	10	8	19	23	4	22	12	10	11				
	Hairaton	AFG	146	119	100	29		30				211		5					150	97	150	
	Beyneu	KAZ	145	18	15								8	7	19							
	Torkham	AFG	128	139	159	31		31						5						96	60	
	Kurmangazy	KAZ	125	50	45	35		15	7	7	7	4	13	7	20	10	60					
	Krasnyi Yar	RUS	50	41	26	26			7	7	7		14	11	39	18	15	4				
	Konysbayeva	KAZ	49	226	224	39		64	29	35			5	6	65	15	18					
	Saryagash	KAZ	49	6	5								4	4	4							
	Istaravshan	TAJ	46	10	11									2	2						10	

Rail Transport

Duration (hrs)

	BCP	Country	Count	Total Average	Total Median	A	B	C	D	E	F	M	N	O	P	Q	R	S	T	U	V	W
1	Dostyk	KAZ	167	24.2	20.0	1.0		4.1						6.0		21.7	4.9	1.6	0.6			
	Ala Shankou	PRC	76	30.4	23.0			4.4								26.0						
	Taraz	KAZ	35	5.7	4.3									4.1		6.2		3.8	0.8			
	Merke	KAZ	11	12.2	7.7	1.4		2.2								12.2		1.1				
	Zhaisan	KAZ	9	7.0	6.3											9.1		2.0				
	Ak Zhol	KGZ	1	2.9	2.9	0.3		0.5	0.1	0.1	0.1					1.5						
2	Beyneu	KAZ	9	2.9	2.8			2.1										2.7				
	Aktau	KAZ	7	7.2	7.0									5.3				2.3	0.4			
3	Saryagash	KAZ	14	4.7	4.6	0.9		1.5								2.0		2.8				
	Keles	UZB	2																			
	Lokot	KAZ	2	7.8	7.8											11.3		2.1				
4	Zamyn Uud	MON	293	18.5	12.0									10.1		9.4	32.9					
	Erenhot	PRC	288	36.4	24.0		0.0	14.4								29.1	40.5					
	Naushki	RUS	90	25.3	24.0											25.3						
	Sukhbaatar	MON	90	22.3	24.0			22.3														
6	Ganyushking	KAZ	9	3.6	2.7	1.3										6.0		2.8				
	Aksarayskiy	RUS	5	1.2	1.2	1.2																
	Beyneu	KAZ	4	2.9	1.8											5.9		1.5				

Cost (US$)

	BCP	Country	Count	Total Average	Total Median	A	B	C	D	E	F	M	N	O	P	Q	R	S	T	U	V	W
1	Dostyk	KAZ	167	645	845			262								0	619					
	Ala Shankou	PRC	76	166	146			127								39						
	Taraz	KAZ	35																			
	Merke	KAZ	11	10	10			10														
	Zhaisan	KAZ	9																			
	Ak Zhol	KGZ	1	49	49	2		32	2	2	2											
2	Beyneu	KAZ	9																			
	Aktau	KAZ	7																			
3	Saryagash	KAZ	14																			
	Keles	UZB	2																			
	Lokot	KAZ	2																			
4	Zamyn Uud	MON	293	203	148									168		63						
	Erenhot	PRC	288	143	140									141		67						
	Naushki	RUS	90																			
	Sukhbaatar	MON	90																			
6	Ganyushking	KAZ	9																			
	Aksarayskiy	RUS	5																			
	Beyneu	KAZ	4																			

Legend: More than 1 hour

More than $100

A. Border Security / Control, B. Customs (Single Window), C. Customs Clearance, D. Health / Quarantine, E. Phytosanitary, F. Veterinary Inspection, G. Visa/Immigration, H. GAI/Traffic Inspection, I. Police Checkpoint / Stop, J. Transport Inspection, K. Weight/Standard Inspection, L. Vehicle Registration, M. Emergency Repair, N. Escort / Convoy, O. Loading / Unloading, P. Road Toll, Q. Waiting/ Queue, R. Change of Railways Gauge, S. Classification of Trains, T. Technical Inspection, U. Commercial Inspection, V. Load Protection, W. Security Services

D. Unofficial Payments

Although unofficial payments have been routinely raised as an issue in cross-border trade, the inherently sensitive and secretive nature of this topic makes it difficult to capture its full extent. For CPMM, drivers are required to determine the nature, whether official or unofficial, and amount spent for each activity. This simple indicator aids in the detection and measurement of unofficial payments along CAREC corridors. For CPMM purposes, unofficial payment is any payment made in excess of the stated official cost of a given activity. The frequency and magnitude of unofficial payments in CPMM samples is presented in the summary table. Information on unofficial payments was captured at each stop along a journey and then tallied to estimate the overall cost to shipments along the corridor. Based on the data, the top five most common activities where truck drivers encountered unofficial payment were customs clearance, police checkpoint, border security/control, weight/standard inspection, and vehicle registration. Meanwhile, the ranking based on amount of unofficial payment showed a different list of activities where the top five included escort/convoy, customs clearance, loading/unloading, border security/controls, and road toll.

Among the six corridors, most unofficial payments are recorded on shipments along corridor 1 where bulk of the samples came from. For the other corridors, a noticeable share of unofficial payments collected during GAI/traffic inspection are recorded for shipments along corridor 3; at police checkpoints for shipments along corridor 4; in connection with road toll and customs clearance for shipments along corridor 5; and during road toll assessment and at police checkpoints for shipments along corridor 6.

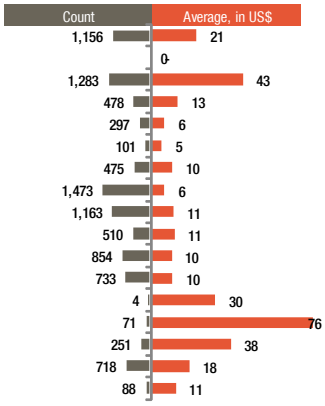
In CPMM, to examine the issue more closely, the probability of encountering unofficial payments was estimated. The probability was computed by dividing the total number of unofficial payments over the total number of stops. Using 'customs clearance' as an example, based on CPMM samples in 2012, there were 4,072 stops where this activity was conducted. 3,310 instances of 'customs clearance' occurred at the BCP and 762 occurred at non-BCP stops (i.e., customs clearance could be done at inland container depots or dry ports). At the BCPs, 1,189 unofficial payments were recorded while 94 unofficial payments were made in non-BCP stops. Therefore, there is 32% chance of encountering demand for unofficial payments during customs clearance.

As presented in the table, unofficial payments are most likely related to vehicle registration and escort/convoy services. The amount for unofficial payments was presented on the right hand side of the table. For customs clearance, unofficial payments averaged $44 at BCPs and $32 in non-BCP stops. Data for both BCP and non-BCP areas were estimated for comparison and for all activities, unofficial payments were always higher (and more frequent) at BCPs than in non-BCP stops.

Unofficial Payments (All stops: BCPs and nBCPs)

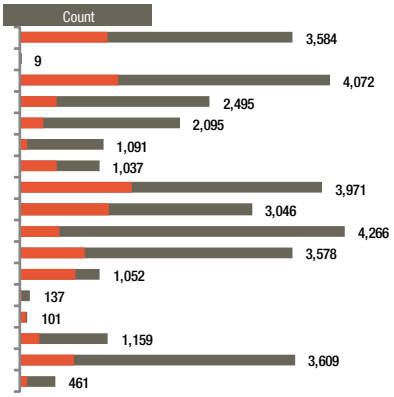
	Count							Size (Average), in US$						
		Corridors							Corridors					
Road	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Border Security / Control	1,156	449	116	69	-	360	162	21	22	6	20	-	23	29
B. Customs (Single Window)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. Customs Clearance	1,283	448	7	74	218	373	163	43	22	20	51	31	80	31
D. Health / Quarantine	478	155	106	48	117	49	3	13	9	3	4	31	7	14
E. Phytosanitary	297	135	11	64	2	85	-	6	8	7	6	0	5	-
F. Veterinary Inspection	101	36	-	41	-	24	-	5	9	-	2	-	2	-
G. Visa/Immigration	475	293	87	15	-	59	21	10	11	5	9	-	15	5
H. GAI/Traffic Inspection	1,473	685	6	479	-	268	35	6	10	7	3	-	3	3
I. Police Checkpoint / Stop	1,163	155	11	57	365	325	250	11	9	3	5	20	5	6
J. Transport Inspection	510	380	16	72	-	33	9	11	11	10	11	-	6	11
K. Weight/Standard Inspection	854	628	135	53	-	31	7	10	11	5	8	-	2	11
L. Vehicle Registration	733	633	31	18	-	48	3	10	11	4	5	-	4	6
M. Emergency Repair	4	1	-	1	-	2	-	30	100	-	0	-	11	-
N. Escort / Convoy	71	5	-	2	-	44	20	76	9	-	98	-	98	42
O. Loading / Unloading	251	11	-	4	197	22	17	38	9	-	9	45	19	4
P. Road Toll	718	-	159	21	4	261	273	18	-	5	36	9	21	22
Q. Waiting/ Queue	88	11	-	2	-	62	13	11	21	-	108	-	5	19

Legend: More than US$100



Probability of Encountering Unofficial Payments

	Count						Average, in US$				
		Total		Unofficial				Total		Unofficial	
Road	Total	BCP	nBCP	BCP	nBCP	%	Average	BCP	nBCP	BCP	nBCP
A. Border Security / Control	3,584	3,016	568	1,076	80	32%	22	22	22	22	14
B. Customs (Single Window)	9	8	1	-	-	0%	28	30	9	-	-
C. Customs Clearance	4,072	3,310	762	1,189	94	32%	129	136	95	44	32
D. Health / Quarantine	2,495	2,055	440	424	54	19%	25	20	49	14	6
E. Phytosanitary	2,095	1,755	340	253	44	14%	9	9	14	7	5
F. Veterinary Inspection	1,091	902	189	66	35	9%	8	9	6	6	2
G. Visa/Immigration	1,037	863	174	445	30	46%	52	55	39	10	14
H. GAI/Traffic Inspection	3,971	539	3,432	89	1,384	37%	7	8	7	7	6
I. Police Checkpoint / Stop	3,046	881	2,165	216	947	38%	8	8	8	16	9
J. Transport Inspection	4,266	1,672	2,594	245	265	12%	22	24	21	10	12
K. Weight/Standard Inspection	3,578	1,753	1,825	484	370	24%	14	13	16	8	11
L. Vehicle Registration	1,052	624	428	341	392	70%	12	10	14	7	13
M. Emergency Repair	137	5	132	-	4	3%	114	133	113	-	30
N. Escort / Convoy	101	67	34	57	14	70%	124	134	106	82	54
O. Loading / Unloading	1,159	1,035	124	245	6	22%	105	94	203	38	30
P. Road Toll	3,609	1,034	2,575	152	566	20%	27	49	19	48	10
Q. Waiting/ Queue	461	239	222	30	58	19%	36	60	10	16	9



C1 Corridor 1: China Railway Alashankou Station

Change of Railway Gauge add to Delays

The width of the rail tracks used by Russian and former Russian Empire railways (including the railways of Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Azerbaijan and Mongolia) is 1.52 meters[10]. It is 8.5 centimeters wider than the 1.435 meters[11] rail gauge used by the railways of China, Turkey, most central/eastern European countries, and all but two western European countries[12].

The gauge width difference prevents interoperability of trains from one gauge system to the other gauge system. At "break of gauge" point between the two systems (usually at or near the border), cargo must be transferred from one rail wagon to another rail wagon[13]. This transfer can take a long time, particularly for bulk or uncontainerized freight. The contents must be unloaded from one wagon, moved to the other wagon and then reloaded.

Aside from interchange delays, many operating problems can occur during the transfer. They include:

- The wagon that the cargo is being transferred to is smaller than the originating wagon. It can result in the contents of one wagon being loaded into two wagons – substantially increasing the rail transport cost.
- During the transfer, the cargo is exposed to pilferage, loss & damage, contamination and degradation of integrity.
- The receiving rail system may experience a wagon shortage. In addition to expected loss of wagon utilization during cargo transfer, the wagon shortage will cause the originating rail system's wagons to wait until an empty wagon becomes available. This can lead to long waits at the border.
- Insufficient material handling capability can also creates unexpected delays. Sudden breakdown of a gantry crane or reach stacker and insufficient number of forklifts for moving heavy pallets are two common problems.
- The weather at the interchange point (like high wind, heavy snow) can also slow down cargo transfer.

Increasing usage of cargo containers speeds up the transfer, reduces pilferage, loss & damage and eliminates the wagon capacity mismatch problem. However, a prolonged shortage of cargo containers and flat wagons still causes long delays at Alashankou and Dostyk.

A number of initiatives are being tested to speed up train movements. The Chongqing-Duisburg train utilizes dedicated train blocks to assure an equal number of wagons is provisioned as the train travels between China (1.435 meters gauge), Kazakhstan, Russia, and Belarus (1.52 meters gauge), Poland (1.435 meters gauge) and Germany (1.435 meters gauge). The Chongqing-Duisburg train also simplifies cross border formalities by simplifying movement documents, eliminating Customs inspection at destination and intermediate border points. Kazakhstan Railways and China Railways have also adopted special procedures to ease transfer – for example, oil pipes made in China are loaded into Kazakh wagons on broad gauge tracks at Alashankou (an exception to Railway Cooperation Organization rules), enabling them to be delivered to destination, avoiding transshipment at Dostyk.

By adopting creative, practical approaches, gauge difference problems can be alleviated.

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10 The 1.52 meters rail gauge is often call the Russian gauge. It is the second most widely used gauge in the world, and spans the entire former Russian Empire, including the Baltic States, Finland, and Mongolia.

11 The 1.435 meters rail gauge is called the Standard Gauge. It is the most widely used rail gauge in the world, not just in Asia, Europe, but also in Canada, USA and some Latin America countries.

12 Spanish and Portuguese Railways utilize the 1.668 meter Iberian gauge.

13 Unlike passenger trains, which replace the bogies (a structure underneath a train wagon to which axles and wheels are attached through bearings) at "break of gauge" points to enable the coaches to proceed to the next system, freight wagons do not often change bogies.

C1 Corridor 1: Europe–East Asia

Corridor 1 is an integral component in the new Euro-Asia highway and railway. Most of the corridor sections lie in Kazakhstan, underscoring its importance to Kazakhstan's cross-border trade and stated intent to establish itself as a preferred route for overland transit traffic. CPMM samples show Kazakhstan's trade relationship with PRC and Russia as well as the frequent movement of goods from Kyrgyz Republic and Uzbekistan along this corridor. The two BCPs with the highest freight throughput in Central Asia are in Corridor 1–Dostyk (KAZ)–Alashankou (PRC) for rail and Khorgos (KAZ)–Khorgos (PRC) for road. The corridor passes through three countries–the PRC, Kazakhstan, and the Kyrgyz Republic, and features three sub-corridors.

Sub-corridor 1a facilitates rail shipments, where Ala Shankou (PRC)–Dostyk (KAZ) is a major gateway then trains continue to Astana or Almaty. From there, the goods can either continue northwards or pass through Kairak (KAZ)–Troitsk (RUS) or turn west to Aktobe, another major railway terminal.

Sub-corridor 1b is also an important section where over 2,200 km of road in Kazakhstan links PRC to European markets. PRC goods pass through Khorgos (PRC)–Khorgos (KAZ) to Almaty. Shipments may continue westwards and pass through Shymkent and Kyzlorda to Aktobe or Aktau in west Kazakhstan.

A typical route in sub-corridor 1c would begin in Khorgos and pass through Khorgos–Saryozek–Almaty–Chiganak–Balkash–Karaganda–Astana–Esil–Kostanai–Kairak–Troitsk. This route spans 2,485 km.

The average time and cost to cross a BCP along corridor 1 is the highest among all the CAREC corridors. Moreover, the average cost to travel a corridor section significantly increased (by 44% in 2011) in 2012, the second most costly (corridor 5 ranked first) among the six corridors. Although the average SWD and SWOD have decreased, the speed along corridor 1 is intermediate compared to the six corridors.

Almost 40% of shipments along corridor 1 were perishables and most of the commodities (32%) that moved along the corridor were agricultural products.

CAREC Corridor 1

Road Transport

Vehicles move at a relatively faster speed even when delays at BCPs are encountered. Shipments travelling along corridor 1 have the following characteristics: (i) a variety of consumer and industrial goods entered Kazakhstan from the PRC and Russia, while metals, scrap metals, and agricultural products were exported; (ii) cargoes were almost entirely shipped in non-containerized vehicles weighing between 10 and 20 tons; and (iii) TIR is widely use, especially for shipments moving between Kazakhstan, the Kyrgyz Republic, and Russia.

In terms of traffic volume, the most travelled sections were: (i) Urumqi–Khorgos–Almaty, (ii) Urumqi–Kashi–Torugart–Bishkek, (iii) Almaty–Karaganda–Astana–Kostanai–Kairak–Troitsk, (iv) Bishkek–Almaty, and (v) Bishkek–Shu–Chiganak–Karaganda–Astana–Kostanai–Kairak–Troitsk. Routes (i), (ii) and (iv) facilitated short distance and regional trade between the PRC, Kazakhstan, and the Kyrgyz Republic. The routes are segments in a notional triangle connecting Urumqi, Almaty, and Bishkek. However, routes (iii) and (v) are the routes with broader international significance. They pass through sub-corridor 1c and facilitate exports to Europe and Russia. Sub-corridor 1c was also the most travelled sub-corridor, accounting

for 47% of corridor 1 samples (compared to 31% for sub-corridor 1a and 22% for sub-corridor 1b).

As a heavily-used section with the potential to serve as an international highway, sub-corridor 1c merits further assessment. A delivery truck might travel at 56 kph along the section of sub-corridor 1c but the overall speed would decrease to around 20 to 30 kph when delays at BCP were considered. Overall shipment cost varies from $1,500 to $2,000, of which 21%, on average, was spent on road activities. PRC exports such as home appliances, textiles, footwear, equipment, machineries, and metal pipes were transported along this route to Russia and European markets.

BCP and Bottlenecks

The table listed BCPs where either long delays or high cost during border crossing was observed in comparison to other BCPs along corridor 1. Any delay of more than 1 hour or cost of more than $100 is highlighted to identify the location and activity easily.

	Corridor	BCPs	Long delay	High cost
1	1a	Alashankou (PRC)–Dostyk (KAZ)	Yes	Yes
2	1b	Khorgos (PRC)–Khorgos (KAZ)	Yes	Yes
3	1c	Torugart (PRC)–Torugart (KGZ)	Yes	No

Alashankou (PRC)–Dostyk (KAZ) BCP pair serves railways primarily, although a small portion of freight is shipped via automotive transport. The average time spent at Alashankou BCP was 353 hours (nearly 15 days). This two-week average dwell time is attributed to extremely long waiting time, to which delays due to customs clearance, health/quarantine, and loading/unloading contributed. Meanwhile, the average border crossing time at Dostyk BCP was 54 hours due to long waiting time. Samples with extremely long waiting time were recorded at the Alashankou BCP by vehicles entering Kazakhstan. These extraordinarily lengthy delays reported in the first quarter of 2012 raised the average duration of delay for the whole year. Data and interviews with drivers suggest that the tighter inspections and fees imposed on shipments of non-member countries entering the Customs Union economic space is one of the negative impacts of the Customs Union on non-member countries.

Khorgos (PRC)–Khorgos (KAZ) has a very high freight throughput each year. The average border crossing time at the PRC side was 65 hours, compared to 17 hours at the Kazakh side. Delays were attributed to long waiting time in queues and customs clearance.

Torugart (PRC)–Torugart (KAZ) serves the Topa–Bishkek traffic, which covers 700 km. The average SWOD was 43 kph but decreased to only 4 kph after border crossing time was accounted. The delay was due to the 18-hour border crossing time at Torugart (PRC), greatly lengthening the delivery time of shipments. Further, the waiting time at Topa (a PRC city where most of the CPMM samples for this section originated) was 96 hours to 120 hours for some samples. No recurring patterns in the delays were observed. However, data suggest that some vehicles leave much later than usual to consolidate additional late cargoes.

Rail Transport

Freight trains moved at an average speed of 45 kph (19 kph if border crossing is considered). This corridor has the fastest SWOD. All three sub-corridors had SWOD of more than 40 kph: the fastest was recorded along sub-corridor 1c at 48 kph. The high speed and low coefficient of variation observed along sub-corridor 1c makes it a preferred rail route. The trains travelling along corridor 1 moved relatively faster compared to other corridors.

Alashankou (PRC)–Dostyk (KAZ) handled the highest rail throughput in the region–16 million tons of goods in 2012. The profile of cargo composition was similar to 2011–minerals, textiles, industrial materials, base metals, and manufactured goods. Goods are carried in standard rail wagons with a capacity of 70 tons. Only a few data samples reported containerization: 20-foot containers were observed containing goods bound destined for PRC. PRC exported manufactured goods to Kazakhstan and imported minerals (iron ores, manganese, and chromites) from Kazakhstan. The goods between Kazakhstan, the Kyrgyz Republic, and Russia moved in non-containerized trains. Corridor 1 allows Kazakhstan to serve transit traffic both for the Kyrgyz Republic and for Uzbekistan shipments to and from the PRC. Shipments from Uzbekistan destined for PRC pass along a combination of corridors 1 and 3, across Keles–Sarygash–Taraz–Shu–Almaty–Saryozek–Aktogay–Beskol–Dostyk, covering 1,820 km to export yarn to the PRC and in turn import manufactured items from the PRC. Shipments from the Kyrgyz Republic bound for PRC use the section Logovoye–Shu–Almaty–Saryozek–Aktogay–Dostyk, covering about 1,293 km to export yarn to PRC and import manufactured items from the PRC to Bishkek.

BCP and Bottlenecks

Alashankou (PRC)–Dostyk (KAZ) had the longest average border crossing time. It took 30 hours on average to cross Alashankou and 24 hours to cross Dostyk. The main cause of the delay is waiting time. The following points describe current operating practices at Alashankou-Dostyk and their contribution to lengthy dwell times:

- Note that gauge change at terminals is done differently on each side of the border. For PRC goods entering Kazakhstan, trains stop at Alashankou. Goods are then unloaded from the train and loaded onto a Kazakh train to Dostyk. For Kazakh goods entering PRC, trains stop at Dostyk and bogies are exchanged from broad (1,520 mm) to standard (1,435 mm) gauge. These procedures are dependent on the availability of rail wagons and influence turnaround time. The shortage of rail wagons prolongs dwell time. Meanwhile, manual loading and unloading results in longer turnaround time while the use of forklifts and cranes greatly reduce dwell time.

- In XUAR, PRC, a chronic shortage of rail wagons is exacerbated during peak periods. PRC exports shipped to the west via XUAR are typically high value and low weight/volume items such as manufactured goods. However, items at XUAR to be distributed to other parts of PRC are typically low value and bulky items such as commodities and scrap metals. Thus, the insufficient number of rail wagons arriving in Urumqi or Alashankou suited to ship bulk commodities creates a situation where the quantity of rolling stock designed to haul bulks is much less than the number required in XUAR for domestic movements. China Railways naturally can dispatch empty rail wagons to XUAR but this is expensive. Due to the limited capacity of rail wagons, it is not uncommon for Chinese exports to wait in Urumqi for more than ten days. Similarly, imports could wait in Alashankou for similar duration until available rail wagons arrive. On a positive note, the infrastructure and material handling system in Alashankou are well maintained, helping to minimize delays.

- Wagon capacity constraints coupled with material handling system problems resulted in long waiting time at Dostyk. Kazakhstan imports much large machinery and equipment, such as drilling machines for oil and gas extraction, which require flatbed rail wagons for transport. Unfortunately, there is a shortage of platform wagons on the Kazakhstan side of the border, resulting in long waiting time as goods could not be trans-loaded. Also, the material handling systems are insufficient for trans-loading as the two fixed cranes at Dostyk for handling bulk cargoes could only manage a maximum of 40 tons. Thus, many of the bulk items could not be moved easily. Further, the cranes tend to break down often. The other cranes available are specially designed to handle only containerized cargoes: they are not capable of trans-shipping bulks.

- PRC freight forwarders also report that delays were caused by inconsistent border crossing procedures. In 2012, PRC forwarders faced unexpected changes in regulations and procedures and were sometimes caught off-guard. In the past, shippers produced the necessary documents to collect cargoes while in 2012 the consignor was asked to produce documents with company stamp. Such changes resulted in more paperwork and caused delays in shipping goods.

- Another problem is the difference in standards between Kazakhstan and the destination country. In one sample, a forwarder had to send construction materials (pipes and racks) to Turkmenistan. Both sides agreed on the documentation–for goods packed in cartons, the gross weight of the whole carton was sufficient. At Dostyk, however, Kazakh Customs demanded to record the net weight of each item in the carton. This incident demonstrates the importance of harmonization in procedures and documentation to ease cross-border trade.

- Although the average border crossing duration at Alashankou was longer than Dostyk, this does not simply imply Alashankou is less efficient since these BCPs are interdependent. The inefficiency of one BCP could actually lengthen the queue at the opposite BCP. The distance from Urumqi to Alashankou is 477 km. At 45 kph, the train should arrive within 11 hours. However, CPMM samples revealed that it took 48 hours to 144 hours for trains to arrive. Due to the long turnaround time at Dostyk, the throughput at Alashankou was affected. Since authorities do not accept long queues of trains inside the BCP, incoming trains settled in one of the thirty terminals along the 477-km route between Urumqi and Alashankou. This waiting time was actually recorded under Alashankou, but physically, trains could be waiting in one of the many railway stations along the 477-km stretch.

C2 Corridor 2: Bukhara/Samarkand

Good Corridor 2 Roads Reduce Travel Time and Supports Economic Growth

The Uzbek section of Corridor 2 that originates (notionally) from Lianyungang on China's East Coast forms part of Asia Highway 63. It is also part of E40, the longest European route that stretches for over 8000 km from Calais in France to the western border of China.

The section between Nukus and Bukhara is also named A380 and the section between Samarkand and Bukhara is also designated as M37.

Along Corridor 2, European automobile parts supply the burgeoning automobile and truck manufacturing industries[14] in Uzbekistan and Uzbek textiles supply markets in Russia and Ukraine.

Uzbekistan, Kazakhstan and the Kyrgyz Republic also traverse Corridor 2 to connect with Corridor 6, linking the Iranian seaport of Bandar Abbas with CAREC countries.

Emulating the Silk Road of yore, trucks from over twenty countries pass through Corridor 2 daily.
The Corridor 2 section between Tashkent and Beyneu, Kazakhstan is quite flat and the road is paved and generally in good condition. With funding from ADB during the last several years, the road quality has improved substantially.

Average speed in excess of 60 km/hour can be sustained at most parts of the Corridor 2 section between Tashkent and Beyneu. At some newly paved parts, speed as high as 110 km/hour can be achieved.

14 Uzbekistan's automobile and truck manufacturing plants include JV MAN Auto-Uzbekistan in Samarkand and GM Uzbekistan in Asaka, Fergana Valley.

C2 Corridor 2: Mediterranean–East Asia

Corridor 2 traverses six countries and is the only one that includes waterborne transport: the trans- Caspian Sea ferry, linking Azerbaijan to the region. Its route offers an alternative 'New Silk Road.' In the east, goods originate or head to Lianyungang in PRC, where consolidation and deconsolidation is done in Urumqi. Cargo trucks head to Kashi in southern XUAR and enter the Kyrgyz Republic through Irkeshtan (PRC)–Irkeshtan (KGZ). Goods then move to Uzbekistan and at Bukhara diverge into two sub-corridors: 2a and 2b. Both sub-corridors converge at Baku via trans-Caspian ferry services. From there, shipments continue to Istanbul and European markets.

Traffic movement reported in 2012 along corridor 2 was similar to 2011 results–CPMM samples showed more active shipment in the western than the eastern section. The general trend indicates that Kyrgyz Republic shippers preferred to transport goods via sub-corridor 1c, where goods head north to Kazakhstan and Russia and less trucks headed west. Uzbekistan shippers use corridor 2 rather intensively, although more samples were presented for sub-corridor 6a, which traces a similar route to access international markets.

An increase in the average time (by 34% from 2011) and cost (by 17% from 2011) to cross a BCP was observed in 2012. However, the average cost to travel a corridor section decreased (from $679 in 2011 to $563 in 2012). The average SWD did not vary from 2011 while SWOD showed improvement (from 40 kph in 2011 to 42.9 kph in 2012). Along sub-corridors 2a and 2b, speed estimates were very similar and consistent with 2011 estimates: SWOD of 43 kph was estimated for both, while the average SWD along 2a was 24 kph and along 2b was 20 kph.

The top three commodities moved along corridor 2 were textiles (23%), agricultural products (20%), and industrial materials (14%). About 31% of transported goods along corridor 2 were perishables.

BCP and Bottlenecks

The most travelled sections along corridor 2 also experienced the longest delays. In 2012 CPMM data, the three BCPs pairs with the heaviest traffic were Alat (UZB)–Farap (TKM), Dautota (UZB)–Tazhen (KAZ), and Artik (TKM)–Luftabad (IRN). Comparing the year-on-year results, Irkeshtan (PRC)–Irkeshtan (KGZ) was missing in 2012 because of data collection and not because of lack of traffic. In

CAREC Corridor 2

2011, China International Freight Forwarders Association (CIFA) participated in CPMM and provided many samples (the largest amount collected in 2011) which showed Chinese trucks moving across this BCP pair. However, CIFA discontinued its data collection, producing a significant reduction in the number of samples. Nonetheless, this BCP pair is still an important gateway for Chinese-Afghan trade as described in corridor 5.

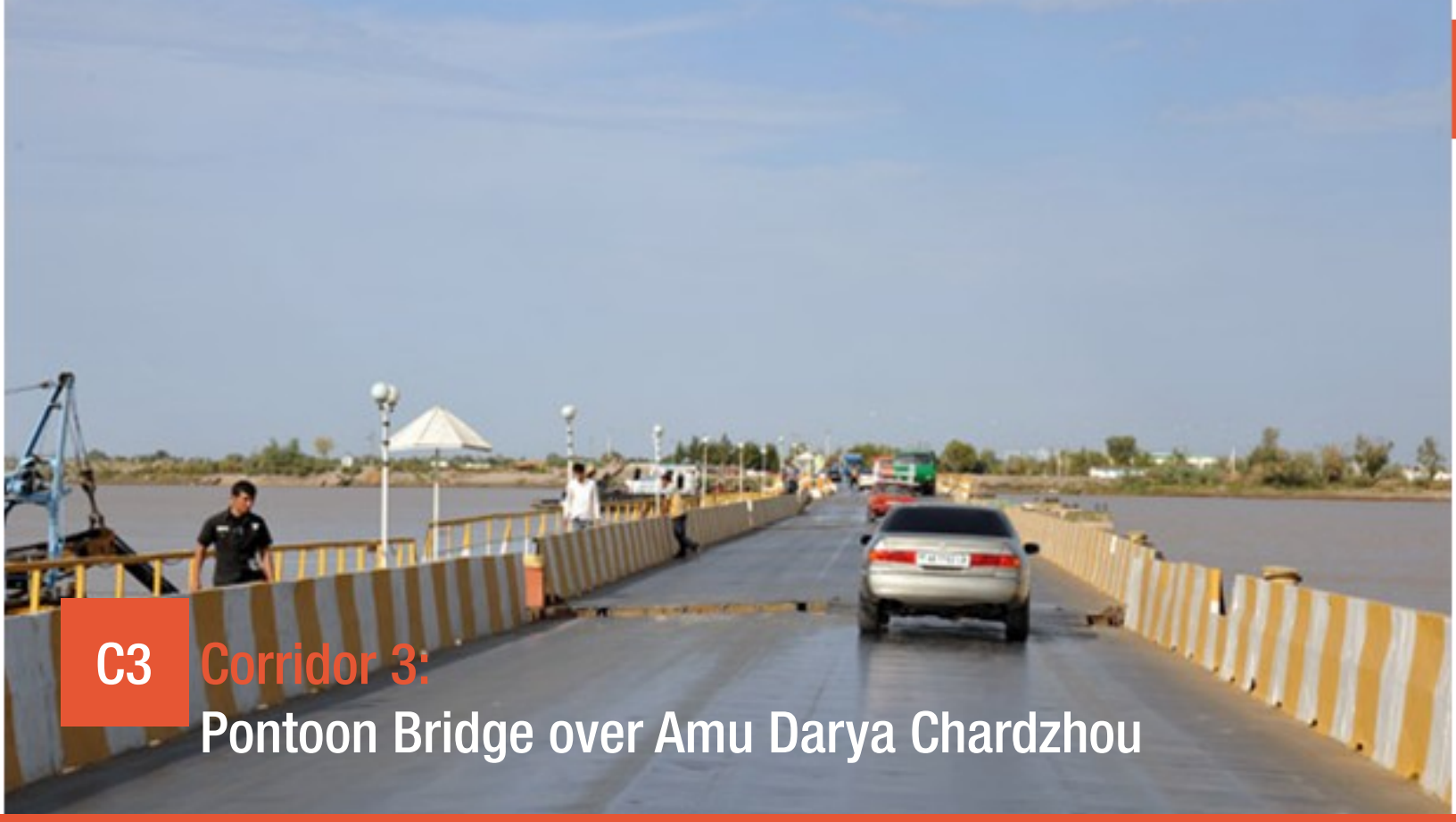
It took an average of 7 and 8 hours to cross at Alat (UZB)–Farap (TKM) BCPs, respectively. A longer border crossing time at Tazhen (KAZ)–Dautota (UZB) was reported (30 hours and 14 hours, respectively). At Artik (TKM)–Luftabad (IRN), the average border crossing time was 15 hours at Artik BCP. Fewer samples were collected at Luftabad BCP which indicated waiting time could be as long as 24 hours.

In the eastern section, shipments are coming from Urumqi and Kashi in PRC which continued to the south to Tajikistan and Afghanistan using corridor 5. In the western section, Uzbekistan is a heavy user of sub-corridors 2a and 2b. However, for shipments to Baku, sub-corridor 6a data is more relevant as samples crossing into Baku using ferry services were not provided. After crossing Dautota (UZB)–Tazhen (KAZ), trucks typically continued northwards and entered

Russia through Sirim (KAZ)–Mastakova (RUS). Many trucks crossed Alat (UZB)–Farap (TKM) in both directions. Trucks would pass Mary coming from Sarakhs (IRN)–Sarahs (TKM) along sub-corridor 3a. No data samples were submitted documenting traffic movement between Ashgabat and Turkmenbashi.[15] The potential of corridor 2 as an international transit option depends on the augmentation of other sub-corridors.

As a regional transit corridor, corridor 2 does have some traffic, albeit few are captured in CPMM. A common section is the movement of trucks between Uzbekistan and Kazakhstan. The popular route is Samarkand to Almaty, spanning over 1,151 km, where agricultural products such as dried fruits are being shipped. Cargoes average 18 tons and no containers were used, but TIR coverage proved popular. A regular trip usually takes a total of 107 hours, where 32 hours were spent driving and 75 hours undergoing activities. The SWOD along this route was 36 kph, while SWD slowed to 10 kph. Trip costs amounted to $1,084, of which 80% were attributed to vehicle operating costs.

15 The lack of information available is attributed to the fact that a Turkmenistan partner has not yet joined CPMM. The data that are available simply indicate that no drivers from CPMM partners in Uzbekistan were asked to provide data for movements along this section.



C3

Corridor 3:
Pontoon Bridge over Amu Darya Chardzhou

The old, narrow floating bridge over the Amu Darya River at Turkmenabat

Located on the banks of the Amu Darya River, in eastern Turkmenistan near the border towns of Farap, Turkmenabat (formerly called Chardzhou) is the second-largest city of the country and an industrial center. It is a key transit point on Corridor 3 connecting Uzbekistan, Tajikistan, Kazakhstan, the Kyrgyz Republic, and Russia with Turkmenistan, Iran, and Turkey. In particular, via the port of Bandar Abbas, Corridor 3 provides many CAREC countries with access to the sea.

There are only two bridges across the Amu Darya River at Turkmenabat. The fixed span railway bridge was built in 2009, but the pontoon bridge for motor vehicles was completed over 35 years ago. 40,000 trucks are estimated to cross this old, narrow, unstable floating bridge per year, paying a toll of around USD 100 for the crossing.

The Turkmenabat pontoon is susceptible to damage by ice buildup during the winter and by strong current and floating ice during the spring. High water level and swift current create hazardous crossing conditions. Trucks must proceed cautiously (and very slowly) as they cross. Suspension of service occurs when water is too high and the current is too strong.

Several times over the past decade, the bridge was damaged in winter causing trucks to wait for weeks for the bridge to be repaired.

Due to the importance of this bridge to Corridor 3, the construction of a new fixed span bridge over the Amu Darya will greatly improve the odds of keeping this important link open year round.

C3 Corridor 3:
Russian Federation–Middle East and South Asia

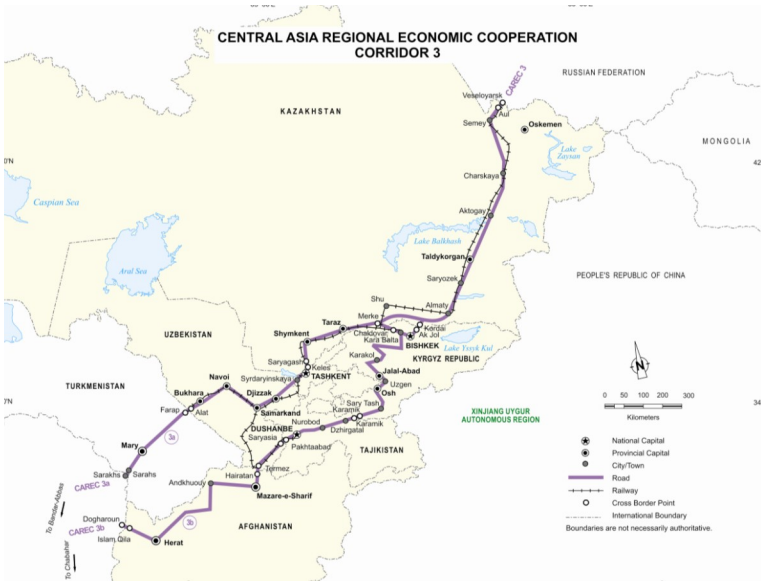
Corridor 3 is a regional transit corridor linking Russia in the north to the Middle East in the southwest. The strategic significance of the corridor is the access it provides to maritime shipping channels in Iran at Bandar Abbas or the new port in Chabahar. CPMM data samples show that machinery and equipment move through Iran into CAREC using Corridor 3a and that there were few shipments from CAREC to Iran.

Corridor 3 yielded relatively fewer samples compared to other corridors since Russia's major markets are situated in the western part while corridor 3 was designed to link the eastern region of Russia. Thus, current trade routes suggest a preference for corridor 6, as indicated by the number of samples collected. The majority of corridor samples are from the southwestern section of sub-corridor 3a covering the Karamyk (KGZ)–Karamyk (TAJ) and Pakhtaabad (TAJ)–Saryasia (UZB) BCP pairs. The latter accounts for more than half of total freight turnover in Tajikistan. It proved difficult to collect data along Hairatan–Andkhuoy–Herat–Islam Qila. The number of shipments along this section may increase when the 75 km railway line from Termez to Mashare-Sharif is fully operational and the ring road in Afghanistan is completed. In sub-corridor 3b, the majority of samples were collected on shipments travelling via Iran, Turkmenistan, and Uzbekistan. The direction of trade suggests more movement of containerized cargo from Bandar Abbas (a seaport in Iran) to Uzbekistan, transiting Turkmenistan. On the other hand, there was less traffic reported for shipments travelling in the opposite direction–from Uzbekistan to Turkmenistan or Iran.

In 2012, a significant increase in the average time (by 29% from 2011) and cost (by 85% from 2011) to cross a BCP was observed. The average cost to travel a corridor section has increased slightly (from $1,012 in 2011 to $1,076 in 2012). Although a slight decrease (from 22.4 kph in 2011 to 21.9 kph in 2012) in the average SWD was observed, the average SWOD showed improvement (from 40.8 kph in 2011 to 44.9 kph in 2012).

About 75% of shipments along corridor 3 were nonperishable (e.g., wood, textiles, industrial materials, machineries, etc.). However, agricultural products were one of the top commodities (17%) transported along the corridor.

CAREC Corridor 3



Road Transport

Corridor 3 recorded the highest average SWOD at 47 kph, while SWD ranked second at 24 kph. Both SWOD and SWD have slightly increased from 2011. The SWOD of trucks moving along sub-corridor 3a was estimated at 49 kph and SWD at 22 kph while SWOD of trucks moving along 3b was 45 kph and SWD was 25 kph. Shipments that moved from Iran into CAREC used 40-foot containers while shipments within CAREC, such as between Samarkand to Almaty, are in non-containerized vehicles. TIR coverage was commonly used in corridor 3; the weight of goods averaged slightly less than 20 tons.

Corridor 3a supports two dimensions of international trade–to facilitate trade between eastern Russia and CAREC via Kazakhstan, and to facilitate trade between the Middle East and CAREC, transiting Turkmenistan and Uzbekistan. In the latter, significant number of shipments from Istanbul to the Fergana Valley passing through Luftabad–Artik–Tejen–Farap–Alat–Bukhara–Samarkand–Tashkent–Kokand–Fergana were observed. Consumer goods were shipped along this route, which covers a distance of 1,560 km. The average trip takes around 4 days, 60% of which (57 hours) were spent on border crossing activities and other stops. The trip costs around $1,400, of which 25% is for activities cost. Vehicles moved at SWOD

37 kph and SWD 16 kph.

BCP and Bottlenecks

Aul (KAZ)–Veseloyarsk (RUS) is the northernmost BCP pair along corridor 3 and the two key BCP pairs in northeast Kazakhstan were Sharbakty (KAZ)–Kulunda (RUS) and Shemonaiha (KAZ)–Gornyak (RUS). Similar to previous years, 2012 samples suggested greater traffic density along the northwestern part than the northeastern part of Kazakhstan. There were no major delays observed at these BCPs.

Significant border crossing delays remain at the Sarakhs (IRN)–Sarahs (TKM) BCP pair: CPMM data report an average of 15 hours' dwell time on each side of the border. Delays were attributed to the long waiting time in queue. Delays were also observed at the Luftabad (IRN)–Artik (TKM) BCP pair along an alternative route. Noting the heavy traffic from Iran to Uzbekistan, an improvement of border crossing procedures at these BCPs would decrease the overall border crossing time. Konysbaeva (KAZ)–Yallama (UZB) and Alat (UZB)–Farap (TKM) were two frequently crossed BCP pairs in 2012. Border crossing time at these BCPs ranged from 8 to 10 hours. The major cause of delay cited was waiting time in queues, followed by visa/immigration, customs clearance, and border security/control.

Further examination of the major cause of delay–waiting time–suggests sub-optimal layout of the BCP as a possible factor. Improved traffic management may be considered as part of a broader initiative to improve BCP operations. In the Konysbaeva BCP[16] for example, an acute turn must be executed by heavy trucks on a narrow 6 meter paved road to the entry gate. This unavoidable maneuver appears to cause substantial traffic along this road, leading to long waiting time.

Rail Transport

Along corridor 3, freight trains moved at an average SWOD of 38 kph and SWD of 17 kph. Due to the challenges in collecting rail data, only samples on sub-corridor 3a were available. The characteristics of the samples resemble those in corridor 1. Perishables were rarely shipped on trains. Most shipments relied on standard 70-ton capacity wagons. The 20-foot containers were used only for shipments to and from PRC. CPMM samples did not include many shipments moving in the north-south direction but rather those moving along a route with particular relevance (Aksu–Degelen–Semey–Charskaya–Ayagoz–Aktogay–Beskol–Dostyk) where corridor 3 meets corridor 1a to facilitate cross border trade between the PRC and Kazakhstan. This distance covers 1, 105 km and requires 2-3 days to complete.

Most shipments did not travel north-south direction but travelled in a west-east or vice-versa direction instead. The northern rail section Kushmurun–Esil–Atbasar–Astana is especially busy. Firstly, it appears to be a trunk route for domestic movement of goods between Aktobe and Kostanai regions to Pavlodar. Many minerals and raw materials like bauxite move along Tobol–Kushmurun–Esil–Atbasar–Astana–Ermentau–Pavlodar. This section spans 2,000km and takes 2-3 days to complete. In the opposite direction, machinery and heavy equipment (e.g., mining equipment) from PRC were transported to Pavlodar and then to Kostanai and Aktobe regions, possibly destined for Atyrau region. The other route which facilitates cross-border trade is the Zhelezorudnaya–Kushmurun–Esil–Atbasar–Astana–Karanganda–Akadyr–Monity–Balkash–Aktogay–Dostyk section which spans 2,125 km and requires about 3 days to cover. Iron ores were shipped from west to east, while machinery and heavy equipment were sent from east to west. Since both routes share the Kushmurun–Esil–Atbasar–Astana section, congestion in one location could lengthen the total transport time.

It is worth considering that, while the CAREC corridor alignment highlights the north-south rail corridor in Kazakhstan, CPMM samples suggest that the east-west rail section Kushmurun–Esil–Atbasar–Astana may also be regarded as a regional rail corridor. It caters to the mining activities in western Kazakhstan and manufacturing activities in the Pavlodar region. An interesting implication is the impact of this rail section on road network design and planning in western Kazakhstan considering the last mile delivery–the transportation of items to the final destination–is invariably by road. A more extensive road network is needed to link rail terminals to the mining sites. Discussions with local transport associations revealed challenges faced by mining companies in moving heavy equipment unloaded at a rail station to the final destination at the mine due to poor connectivity and road quality in some parts of western Kazakhstan.

BCP and Bottlenecks

Sarygash (KAZ)–Keles (UZB) is the key gateway along corridor 3. The limited number of samples showed that average border crossing time at Sarygash was 4.7 hours due to waiting time and classification of trains. In the north, Aul BCP serves road traffic while the trains cross the Lokot BCP, where waiting time can take up to 11 hours. Compared to other corridors, border crossing time at these BCPs is not as time-consuming.

16 Konysbaeva-Yallama (KAZ-UZB) experiences significant traffic. Although the actual CAREC BCP is designated at Zhibek Zholy, the BCP on the Uzbekstan side is closed to freight traffic. Konysbaeva is the only one out of the five BCPs in the southern part of Kazakhstan's Shymkent oblast from which Uzbekistan allows freight traffic to enter. Permitting the movement of freight across other nearby BCPs would quickly reduce the queue at Konysbaeva and thus reduce overall border crossing time.

C4 Corridor 4: Zamyn-Uud, Mongolia

Long truck queue in peak season at Zamyn-Uud BCP waiting for customs clearance

Zamyn-Uud, Mongolia is the busiest border crossing point on Corridor 4b. It is the gateway for Chinese goods entering Mongolia as well as for overseas cargo imported though China's Tianjin port.

Due to Mongolia's short summer, this border crossing point experiences a tremendous traffic surge between late May and early October. Large amounts of construction materials, furniture and appliances for new/refurbished homes, construction equipment, and mining equipment are added to the ordinary cargo traffic flow. The large jump in traffic strains the border clearance capacity as well as Mongolian Railways' carrying capacity. During the busy summer peak, it is not uncommon for queues to extend for 3 km and for trucks to wait 7-10 days before cargo is cleared and trans-shipped to the railway.

ADB is financing the construction of the Zamyn-Uud Logistics Center, a 128 hectares facility located 5.8 km north of the Mongolian/China border. It is a multimodal logistics facility that will provide rail/rail, truck/rail and truck/truck transloading services for containerized cargo, heavy cargo, and palletized cargo as well as storage, distribution, inspection and other value-added logistics services. Government agencies like Customs, Sanitary/Phyto-Sanitary, and Veterinary Inspection will also be located at this new logistics center. Increased border clearance and cargo handling capacity will alleviate the strain from annual traffic surges.

In addition, the road from Zamyn-Uud to Ulaanbaatar is expected to be fully paved soon. This will open up more transport capacity to reduce exclusive reliance on rail transport.

ADB's Mongolia/China border cooperation program is also facilitating trade flow between the two countries by fostering streamlining of cross border procedures and collaboration in resolving logistics bottlenecks.

C4 Corridor 4: Russian Federation–East Asia

The significance of corridor 4 lies in Mongolia which presents the shortest distance for goods moving between Russia and East Asia. Mongolia is developing this route as a viable alternative to other corridors linking East Asia to Europe. Under the Transit Mongolia program, the government has been actively promoting CAREC corridor 4. The International Freight Forwarding Centre of Mongolian Railways also highlights that the total distance between Brest (on the Polish-Belarus border) to Tianjin port in PRC is 1,135 km shorter than the East Siberian railways and 1,600 km shorter than other CAREC routes.[17] Being landlocked, Mongolia relies largely on the 980 km Erenhot–Jining–Tianjin route to access the seaport Xingang for its exports to East Asia. Corridor 4 has two sub-corridors: 4a and 4b. Sub-corridor 4a connects Russia to Urumqi in XUAR. Although Russia and PRC share a border between Mongolia and Kazakhstan, the area is very mountainous and virtually impassable due to harsh weather condition. In 2012, the traffic along sub-corridor 4a was light. This may change once the Kushuut mine starts full operation (expected in 2013). The mining company constructed a 300-km road from the mine to the Yarant BCP. However, the number of shipments in sub-corridor 4a is significantly less than the shipments that pass along 4b; hence CPMM efforts are currently more focused on 4b.

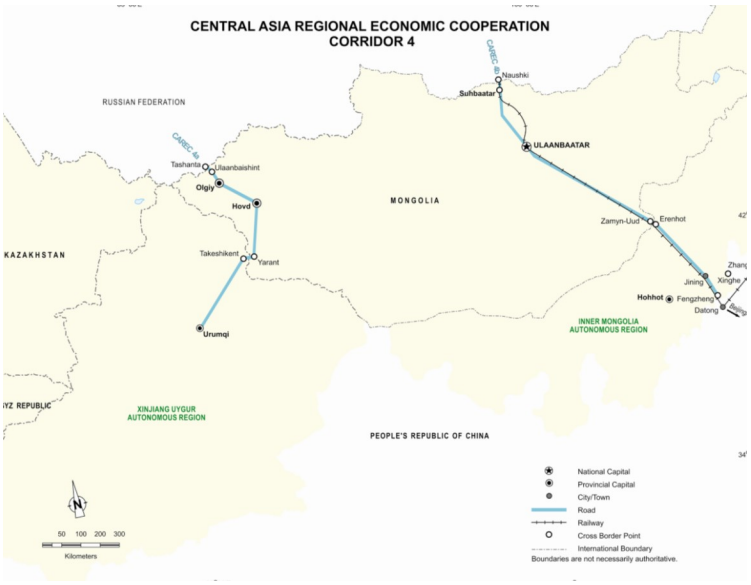
The average time to cross a BCP increased slightly (from 11.8 hours in 2011) to 12.2 hours in 2012. Although the average cost incurred at border crossing clearance decreased marginally (from $182 in 2011 to $173 in 2012), crossing a BCP along corridor 4 is more costly than along all other corridors, with the exception of corridor 1. A significant decrease (by 23% from 2011) in the average cost to travel a corridor section was observed while the average SWD and SWOD did not vary from 2011.

The top three commodities shipped along corridor 4 were textiles (14%), base metals (17%), and manufactured items (12%). Most of the shipments were nonperishable (only 18% were recorded as perishables).

Road Transport

Along sub-corridor 4a, Russian cargoes move through the Mongolian population centers of Olgii, Hovd, and Yarant before reaching Urumqi in XUAR, PRC. In sub-corridor 4b, road traffic occurs in two segments–from Khiagt (RUS) to Ulaanbaatar in the north and from Ulaanbaatar to Erenhot (PRC) in the south. Sub-corridor 4b is also

CAREC Corridor 4



part of Asian Highway 3, which extends from Ulan-Ude (RUS) to Tianjin (PRC). Paving of the last remaining unpaved segment between Sainshad and Zamyn-Uud is scheduled for completion by the end of 2013.

In 2102, vehicles moved at an average SWOD of 34 kph and SWD of 20 kph along corridor 4. CPMM data fairly reflected the broad trade relationship between the PRC, Mongolia, and Russia. Most data samples recorded shipments from Russia or PRC into Mongolia. A diverse variety of goods were imported–consumer goods (food, plastic wares, consumer electronics, shoes, cosmetics, and medicine), industrial products (such as chemicals), and machinery. Building materials were shipped into Mongolia during spring and summer, coinciding with the brief construction season. Shipments averaged 20 tons in weight in non-containerized cargo. Also, the use of TIR was very rare and most imports were transported to Ulaanbaatar.

Shipments along corridor 4 were rather expensive compared with other corridors due to high vehicle operating cost. For a distance

17 http://www.iffc.mn/web/index.php?lang=en&pid=64

from Khiagt to Ulaanbaatar (337 km), a trip cost close to $1,000. From Erenhot to Ulaanbaatar, the total shipment cost averaged $2,000. When converted to a standard distance of 500 km carrying 20 tons, the standardized cost was calculated to be $1,350.

The average border crossing time at key BCP pairs along corridor 4–Khiagt (RUS)–Altanbulag (MON) and Erenhot (PRC)–Zamyn Uud (MON)–is less than the overall average time to cross a road BCP in CAREC.

Rail Transport

Along sub-corridor 4b, freight trains pass through Naushki (RUS)–Sukhbaatar (MON) in the north and Zamyn Uud (MON)–Erenhot (PRC) in the south. It is the artery for domestic and external trade. Mongolia has been promoting this "Trans-Mongolian Corridor" since 2002 by running a dedicated container block train service that operates three times per month carrying goods from Ulaanbaatar to Brest (about 7,000 km). On the other end, the corridor links Mongolia to Tianjin Xingang (PRC) seaport which handles more than 80% of Mongolia's imports and exports.

The average SWOD of 15 kph and SWD of 7 kph was notably slower compared to the speed of train travel registered in other corridors. A lack of rolling stock and inadequate physical infrastructure caused the long waiting time at key railways terminals of Tolgoit, Choyr, and Sainshand. On average, goods from Tianjin reach Ulaanbaatar within 12 to 14 days. CPMM data show that the shipping cost of a 40-foot container from Tianjin to Ulaanbaatar (1,692 km) was about $5,000. The standardized cost was calculated to be close to $1,500 per 500 km at 20 tons, even more expensive than the road standardized cost of $1,350. The high cost was attributed to the difference in trade volume–Mongolia imports from more than it exports to PRC, thus a number of containers are returned empty to Tianjin.

Those who have been observing Mongolia's economic development have noticed the mining boom and its spillover effects on other sectors. When Oyu Tolgoi commences operations in 2013, there should be a sizeable demand for transport services. An interesting question will be its impact on CAREC corridor 4. Unfortunately, there is no existing railway serving the Gobi area where most of the new mining activities are taking place. Huge trucks with capacities of 50 to 120 tons are presently used to move coal and ores from the Gobi region to Gashunsuhait (MON)–Ganqimaodao (PRC). It makes eminent sense to establish a railway link. A relevant question is whether to extend the current north-south railway from Sainshand to Oyu Tolgoi, or to build a new railway line to the mining district that links to the PRC network.

BCP and Bottlenecks

Crossing the Erenhot (PRC)–Zamyn Uud (MON) BCPs was rather time consuming. The average time to cross Erenhot was 36 hours; Zamyn Uud was 18 hours. Delays were attributed to the long waiting time in queues, change of gauge procedures, and customs clearance (these causes of delay have been observed consistently since 2010). While Mongolia may not control the delays at Tianjin, improvement of infrastructure at Zamyn-Uud may minimize these delays.

C5 Corridor 5: Karamyk

Poor Condition of Some Corridor 5 Sections Increases Travel Time and Reduce Safety

89% of the 345 km Dushanbe – Karamyk Road is paved. The 33 km section near Roghun Dam and the 12 km section in "no man's land"[18] between the Tajik Karamyk/Kyrgyz Karamyk border posts are unpaved, and in very poor condition. The two sections lied in landslide zones with steep slopes, undulating terrain, and suffer from a lack of lane markings. The lanes, notional as they are, are narrow, unlit, and feature many sharp turns that block driver visibility.

The picture shows cargo trucks struggling to climb the sandy slope after the road dips, causing all trailing vehicles to slow down. Therefore, it takes a significant amount of time for a truck to travel between the Tajikistan and Kyrgyz Republic border posts at Karamyk. The embankment on each side of the road is also steep, with 50-100 meter drops. A vehicle that veers off the road will severely injure or kill its occupants.

The entire stretch of Corridor 5 is plagued by very harsh winter weather, with snow drifts up to 3 meters high. Due to limited resources, it can take quite a few days after the blizzard to clear the road. Avalanches, rock slides, mud slides, and wash outs are common travel hazards along Corridor 5, sometimes blocking a large segment of the roadway. Trucks have to share the Corridor with live animals – from wandering mules to large herds of cattle and sheep. The drivers have to be extremely cautious to avoid hitting animals, mud piles and rocks, especially under low visibility situations.

ADB is funding improvements of Corridor 5, but maintaining the road surface in good order will be a challenge since funding for road repairs and maintenance is quite limited. As the newly improved sections age and as they are damaged by overweight trucks, harsh weather, avalanches, mud slides and wash outs, the expense of repairs and maintenance will increase. Governments should develop an effective funding mechanism (e.g. tolls, fuel tax) to provide for the improvement and upkeep of Corridor 5.

18 No man's land as used herein refers to the segment of Corridor 5 that straddles a boundary between two border crossing posts. It was not occupied due to difficult terrain, harsh climate and insufficient space to construct border management facility as well as to provide a buffer between the two countries.

C5 Corridor 5:
East Asia–Middle East and South Asia

Corridor 5 connects East Asia and CAREC to South Asia. It is a road-only corridor because the PRC railway ends in the southern part of XUAR, the Kyrgyz Republic and Tajikistan railway network is not well connected, and the only railroad in Afghanistan is the ADB-funded 168 km rail link connecting Termez in Uzbekistan to Mashar-e-Sharif. Corridor 5 is used mainly for regional road transit. It also provides access to the seaports of Karachi and Gwadar in Pakistan via Torkham (Afghanistan BCP)–Karachi (about 1,750 km). This route has the potential to enhance regional trade. The movement of cargoes along corridor 5 can be grouped into a few routes: (i) from Kashi (PRC) crossing the Kyrgyz Republic at the Irkeshtan (PRC)–Irkeshtan (KGZ) BCP pair into Tajikistan through the Karamyk (KGZ)–Karamyk (TAJ) BCP pair, then stopping at Dushanbe; (ii) the Karamyk (KGZ)–Tursunzade (TAJ) route; and (iii) Torkham (PAK)–Shirkhan Bandar (AFG) route, one of the busiest sections in Afghanistan.

The average time to cross a BCP along corridor 5 increased from 6.8 hours in 2011 to 8.3 hours in 2012. At the same time, 2012 observed a significant (by 25% from 2011) decrease in the average cost incurred at border crossing clearance. The average cost to travel a corridor section decreased marginally from 2011 but continued to be the most expensive of the six corridors. The average SWD decreased from 19.4 kph to 17.3 kph while SWOD slightly increased from 30.5 kph to 33.1 kph.

Corridor 5 had the least count and variety of commodities. Agricultural products accounted for 20% of transported goods while the rest are nonperishable–wood (18%), base metals (18%), industrial materials (17%), and machinery (16%) comprised the core of goods shipped; textiles, mixed cargoes, plastics, and manufactured items constituted the residual 11% of shipments.

BCPs and Bottlenecks

Irkeshtam (PRC)–Irkeshtam (KGZ) and Karamyk (KGZ)–Karamyk (TAJ) are the key BCPs along this corridor. CPMM data showed significant increase from 2011 to 2012 in the average border crossing time at Irkeshtan (PRC) (from 15.2 hours to 51.1 hours) and at Karamyk (KGZ) (from 9 hours to 15.8 hours). Although these two BCP pairs have been identified previously as bottlenecks, the observed durations of delays were unexpectedly long. CPMM partners and drivers attributed the extremely long waiting time indicated in some of the samples to adverse weather conditions and temporary closure

CAREC Corridor 5

of the border. Excluding these few outlier samples, the result showed improvement in border crossing time. The four main reasons for the lengthy border crossing time at the Irkeshtan (PRC)–Irkeshtan (KGZ) BCP pair were:

■ Two Stop for Cross-Border Clearance Formalities

Irkeshtan (PRC) is actually the old location. The new customs clearance facility run by the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) is set up at Wujia. Unlike Irkeshtan which is 3,000m above sea level, the climate and terrain at Wujia is not as harsh. Wujia is also closer to Kashi, where the customs officers reside. Therefore, a truck has two stops for border crossing procedures. The Custom clearance, health and quarantine inspections, and weight inspection are done at Wujia while border security/control, visa, and immigration as well as GAI/traffic inspection are done at Irkeshtan. The trucks, therefore, spend more time in border crossing activities because they will have to queue twice.

■ BCP Operating Hours

The Irkeshtan (PRC) BCP is only open 5 days a week. Drivers even reported that sometimes the operation was effectively less than 5 days–when customs officials arrive Monday after lunch and would leave after lunch on Friday afternoon to travel to and from Kashi where they reside. Drivers reported that by Thursday at Wujia, there will be a long queue of trucks because drivers hope to reach Irkeshtan by Friday morning. The BCP closes at 8pm Friday so if truck drivers could not complete the procedures at Irkeshtan, they would have to wait until Monday morning. The parking fee costs around $5 per day, which means staying over the weekend would cost $15.

Terrain

The road between Wujia to Irkeshtan is 170 km, but CPMM data shows it takes 4 to 6 hours to complete this journey (travel time on a paved road should be half the time). The road is windy, narrow, and dusty, contributing to the long queue and lengthy border crossing time.

Category of Traffic

Border crossing time surged in the fourth quarter. In November 2012, many trucks were denied permission to cross the border at Karamyk, so truck drivers became surly. The reason cited based on the meeting between ministries and customs was that Karamyk is considered a bilateral BCP. Therefore, only drivers that are nationals of the Kyrgyz Republic and Tajikistan were allowed and only goods meant for the two countries were permitted. Thus, shipments from Bishkek (KGZ) bound for Kabul (AFG) encountered problems. While the matter was being negotiated, other drivers with international shipments drove through Osh and other locations. For twenty days pending resolution, the drivers were compelled to re-route to Kyzyl-Bel in Batken oblast. Kyzyl-Bel is a multilateral BCP located 350 km east of Khujand, Tajikistan. The cost of re-routing and additional documentation for each truck was reported at $1,000. Further, its mountainous terrain is more difficult compared to Karamyk. Karamyk was re-opened to international shipments on 20 December 2012. The incident highlights the need for consistency in applying the rules and regulations as well as for providing timely communication and information to users to help transporters avert significant delays and costs that CPMM has captured. An explanation for the incident was requested from the CPMM partners and drivers when the significant increase in the border crossing time reported was observed.

C6

Corridor 6: Hairatan-Mazare-e-Sharif Railway Line

The Hairatan-Mazare-e-Sharif Railway Line completed in 2012

ADB financed the construction of a 75 km railways line connecting Hairatan to Mazare-e-Sharif, which was completed in 2012. Uzbek Railways (UTY) was given a three year concession to operate this line (through 2015). Freight operations await the construction of a new facility for customs services at Hairatan, for which additional equipment is required.

In general, border crossing in Afghanistan is quite fast: most vehicles are cleared within 1-2 hours. A common cause of delay is the incorrect declaration of goods. For example, if a commercial shipment is declared to be under a non-commercial or International Security Assistance Force shipment, the truck could be held up by Customs to verify the nature of the goods, resulting in delays. Torkham is the most heavily crossed BCP. Due to the high number of trucks, congestion and truck parking problems result in longer waiting time. To automate border crossing, the World Bank has supported the installation of ASYCUDA++ at Torkham, Hairatan, Shirkhan Bandar, and Islam Qila.

Afghanistan acceded to the TIR Convention in 2010. Unfortunately, implementation problems prevent Afghanistan trucking and logistics companies from realizing the full benefits of this transit system. Afghanistan trucks are relatively old and do not satisfy the European standards. Furthermore, neighboring countries do not grant visas readily to drivers carrying Afghanistan passports. Obtaining an international driving license is also not easy for drivers from Afghanistan. Afghanistan ministries are keenly aware of this problem and are working with the International Road Union and other countries to resolve it.

Understanding the importance of having an efficient transportation, Afghanistan is also actively exploring different options. Having concluded a revised Afghanistan-Pakistan Transit Transport Agreement (APTTA) to replace the 1965 version, the country is also keen to accede to the Cross Border Transport Agreement between the Kyrgyz Republic and Tajikistan. Afghanistan is also discussing with Iran a Joint Customs Control initiative.

C6 Corridor 6: Europe–Middle East and South Asia

Corridor 6 serves many Central Asian economies. Major highways and railways cross Afghanistan, Kazakhstan, Tajikistan, and Uzbekistan. It also serves Iran, Pakistan, and Russia. Corridor 6 consists of three sub-corridors 6a, 6b, and 6c, with sections linking to other corridors.

Sub-corridor 6a offers both roads and railways. The route starts from the BCP pairs Krasnyi Yar (RUS)–Kurmangazy (KAZ) for road and Aksarayskaya (RUS)–Ganyushking (KAZ) for rail in the western part of Kazakhstan. It passes through major Kazakhstan cities (Atyrau and Makat) and enters Uzbekistan at BCP pair Tazhen (KAZ)–Dautota (UZB). The route then continues through Nukus, Bukhara, and Navoi, entering Afghanistan at Termez (UZB)–Hairaton (AFG). Finally, the route moves westwards and enters Iran at Afghanistan's Islam Qila BCP. The northern section of this route in Kazakhstan and Uzbekistan shares the same right of way as sub-corridor 2a, except for the most northern part where sub-corridor 6a continues on a road journey around Atyrau while sub-corridor 2a goes on to the Trans-Caspian route using ferries. The southern section of 6a shares the same right of way as sub-corridor 3b.

Sub-corridor 6b, in between 6a and 6c, is the east-west section within Uzbekistan that enables trucks carrying goods from the Middle East and Russia to enter CAREC. Goods come from as far as Turkey, Estonia, and Latvia.

Sub-corridor 6c starts from the BCP pair Kos Aral (RUS)–Zhaisan (KAZ) and passes through Aktobe, Kyzlorda, and Shymkent (this route is fairly similar to sub-corridor 1b), serving both road and rail shipments. The route then extends southwards to Uzbekistan, passing through Sarygash (KAZ)–Keles (UZB) for railways or Konysbaeva (KAZ)–Yallama (UZB) for trucks. After going through Tashkent, it enters Tajikistan and passes through Dushanbe to BCP Nizhni Pianj (TAJ)–Shirkhan Bandar (AFG). The rest of the section is shared with corridor 5 moving through Kundoz, Kabul, and Jalalabad to Pakistan through Torkham (AFG) –Landi Kotal (PAK) BCP.

The average time to cross a BCP along corridor 6 increased from 5.6 hours in 2011 to 7.5 hours in 2012. At the same time, a significant decrease (by 40% from 2011) in the average cost incurred at border crossing clearance was observed together with a drop in the average cost to travel a corridor section (decreased by 22% from 2011). Moreover, the time and cost to cross a BCP is shorter and less expensive compared to corridors 1, 2, 4, and 5. 2012 results showed an increase in the average SWD (from 22.9 kph to 27.6 kph) and SWOD (from 36.7 kph to 37.4 kph). About 34% of commodities moved along corridor 6 were agricultural products followed by textiles (15%) and industrial materials (11%).

CAREC Corridor 6

Road Transport

Trucks reported an average SWOD of 37 kph and SWD of 28 kph. Compared to other corridors, the least percentage drop in speed was observed along corridor 6. Sub-corridor 6a was the most frequently used sub-corridor while 6b was less used. Along sub-corridor 6a, an active trade between Russia and Uzbekistan was observed–Uzbekistan exports yarn, textiles, fruits, and vegetables to Russian cities like Moscow, St. Petersburg, and Novosibirsk. In exchange, products such as medicine, yogurt, plastics, beverages, and building materials were imported from Russia. Meanwhile, along sub-corridor 6b, although trucks move quite fast at 46 kph, the SWD was far lower at 19 kph. These observations were consistent with reports from previous years.

BCP and Bottlenecks

In the north, trucks cross the BCP pair Kurmangazy (KAZ)–Krasniy Yar (RUS) or Zhaisan (KAZ)–Kos Aral (RUS). There was no major problem reported at the former, while the latter appeared to be unpopular as most trucks used alternative BCPs at Taskala (KAZ)–Ozinki (RUS) or Sirim (KAZ)–Mastakova (RUS).

In the central region, trucks cross the BCP pair Tazhen (KAZ)–Dautota (UZB) or Konysbaeva (KAZ)–Yallama (UZB). Shipments encountered some delays on both BCP pairs but waiting time was longer at Tazhen–Dautota. The average border crossing time at Tazhen was 19.3 hours and 15.7 hours at Dautota. The design of the BCP is one contributing factor to the long waiting time. For example, in Tazhen, since there is no segregation between cargo trucks and passenger cars, the border crossing distance of only 75 meters took much longer time. Segregation of trucks and passenger cars may reduce the border crossing time; dedicating a lane for TIR trucks may lead to even faster border crossing time since Tazhen–Dautota facilitates traffic of TIR Convention signatories–Kazakhstan, Russia, and Uzbekistan.

In the south, the average border crossing time at Ayratan BCP was 17.2 hours due to long waiting time. Substantial traffic was also observed along the Ayratan–Hairatan–Pulkhumri–Kabul route. A noteworthy observation is the unutilized routes along the corridors in Afghanistan, numerous shipments between Iran and CAREC notwithstanding. Trucks instead travelled through Turkmenistan.

Rail Transport

Trains moved at 36 kph (SWOD) and 17 kph (SWD) along corridor 6. These results were similar with those reported in 2011. Significant freight movement was observed along corridor 1 but not much along corridor 6 where shipments were mainly in Atyrau oblast. The trains moved at 30-37 kph (SWOD) and 10-12 kph (SWD) along the Aksarayskaya–Ganyushking–Atyrau–Makat–Kulsary segment, covering 547 km. Shipments to Kulsary were mainly of machinery while shipments from Kulsary were minerals, especially sulphur.

BCP and Bottlenecks

There were no problems reported at the key BCP pair Ganyushking (KAZ)–Aksarayskaya (RUS). The time to cross the BCP marginally decreased from 3.8 hours in 2011 to 3.6 hours in 2012.

VI. Hypothesis Testing

Impact of Customs Union on Border Crossing in Central Asia

The launch of the Customs Union (CU) by three founding member countries (Belarus, Kazakhstan and Russia) since 1 January 2010 ushered in a period of higher growth between the members. Using 2009 as the base year, trade between the three countries increased by 25% in 2010 and 66% in 2011. Customs borders were effectively removed starting July 2011[1]. In theory, this should reduce the border crossing time for shipments travelling within the territories of member countries. Of the three countries, Kazakhstan is a participant in the Corridor Performance Measurement and Monitoring (CPMM) exercise. By analyzing CPMM data, it is then possible to compare border-crossing situations between Kazakhstan-Russia and Kazakhstan with non-CU members. Besides Russia, Kazakhstan also shares land borders with Kyrgyz Republic, PRC, Turkmenistan and Uzbekistan[2]. This section attempts to analyze data collected in the CPMM to answer the following questions: (1) What is the impact of the CU on the border crossing efficiency? (2) Are there less delivery trucks crossing between Kazakhstan and Russia? (3) Are there less delivery trucks crossing between Kazakhstan and non CU countries?

For the period starting January 2010 to December 2012, all data that contained border crossing with Kazakhstan are divided into two groups; one group consists of trucks travelling between Russia and Kazakhstan, and the other consists of trucks travelling between Kazakhstan and a non-CU member country. Within each group, the data is further classified according to direction of trade, i.e. whether the truck is entering or exiting Kazakhstan. Effectively, there are four groups after proper classification. Inferential statistics is then applied to the data set to derive the following results. In addition, the analysis is only applied to road transport. Rail transport is excluded from this analysis due to the small sample size.

From the table, a few key observations are apparent.

1. After the formation of CU, shipments between Russia and Kazakhstan enjoyed shorter border crossing time. Trucks leaving Kazakhstan into Russia used to take an average of 7.7 hours, but the time is now reduced to 2.9 hours at either border crossing point (BCP).
2. On the other hand, trucks travelling between Kazakhstan and non-CU countries did not enjoy the same benefit. There is no significant change in border crossing time for trucks leaving Kazakhstan going to non-CU countries. However, trucks entering Kazakhstan from non-CU countries took much longer. The border crossing time of a

- According to CPMM data, total border clearance duration in KAZ-RUS BCPs clearly dropped, in either direction, after the implementation of Customs Union.
- However, significant increase in border-crossing duration was also observed when entering KAZ from a non-CU member country (NCU) from 9 to 22 hours.
- This overall increase is mainly due to increase in the following activities: waiting in queues, customs clearance, health/ quarantine, and transport inspection

Impact of Customs Union

		Total Duration		Border Security		Customs Clearance		Health / Quarantine		Phyto-sanitary		Veterinary Inspection		Visa/Immi-gration		GAI/Traffic Inspection		Transport Inspection		Weight Inspection		Wait/Queue	
		B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A
Exiting KAZ																							
To Russia	KAZ Side	7.7	2.9	0.6	0.6	2.2	1.0	0.4	0.2	0.4	0.2	0.3	0.2	0.5	0.3	0.3	0.5	0.5	0.4	0.5	0.3	4.7	2.7
	RUS Side	7.7	1.8	0.6	0.5	2.7	1.1	0.5	0.2	0.5	0.2	0.3	0.2	0.3	0.1	0.3	0.3	0.8	0.5	0.5	0.3	4.3	2.0
To a Non-CU Country (NCU)	KAZ Side	8.1	13.0	0.6	0.5	2.1	1.0	0.4	0.2	0.4	0.2	0.3	0.2	0.2	0.2	0.4	0.2	0.7	0.4	0.5	0.3	5.5	14.0
	NCU Side	4.3	7.0	0.5	0.4	1.4	0.9	0.3	0.5	0.3	0.2	0.2	0.2	0.3	0.4	0.2	0.1	0.3	0.2	0.3	0.3	3.5	6.7
Entering KAZ																							
From Russia	KAZ Side	5.8	2.1	0.5	0.6	2.2	1.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.5	1.3	0.4	0.5	0.4	0.2	4.0	1.6
	RUS Side	7.8	1.5	0.6	0.5	2.7	1.3	0.4	0.2	0.4	0.2	0.3	0.2	0.3	0.2	0.2	0.3	0.6	0.4	0.5	0.2	4.8	1.2
From a Non-CU Country	KAZ Side	10.4	10.6	0.7	0.5	3.1	3.2	0.4	0.6	0.5	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.8	0.4	0.5	0.4	6.8	6.7
	NCU Side	8.6	21.5	0.5	0.4	1.3	1.8	0.5	1.5	0.4	0.4	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.3	0.4	0.3	10.2	20.8

Legend: B Before 1 July 2011
A After 1 July 2011
Significant decline, at 5% level
Significant increase, at 5% level

truck from the other side entering KAZ BCP has to spend, on average, 21.5 hours compared to 8.6 hours before the CU. This is statistically significant at 5% level.

To account for this significant increase, the activities that showed sharp increase in duration were identified. Those activities were **customs clearance, health/quarantine inspection, GAI/Traffic inspection, transport inspection and waiting in queue.** Waiting in queue was a significant contributor to long delays during border crossing even before the formation of the CU. Interestingly, this average duration doubled from 10.2 hours to 20.8 hours after the CU took effect. While preliminary analysis revealed this issue, it is still too early to make a definite conclusion. We also need to explore the reasons behind the problem. Was it a direct or indirect consequence of the CU? Or are there any other reasons? CPMM would continue to monitor this topic over the next few quarters.

Methodology

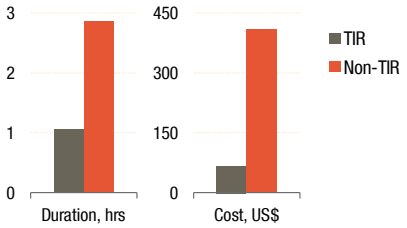
Independent samples T-test was utilized in testing the difference of border-crossing duration before and after CU. This technique is usually used to perform significance test in the means of two independent groups. F-test is also used to test the homogeneity of variance of border-crossing duration data.

Analysis of TIR Carnets in CAREC Corridors

The TIR carnet facilitates the movement of goods in international trade while effectively providing a global transit insurance coverage to satisfy bond or guarantee requirements when vehicles pass through transit countries. It was designed to eliminate delays in transit that occur when long-distance vehicles are held up for customs inspection at every frontier. The governing procedures and processes underpinning TIR are described below.

Given the benefits accruing from the TIR system, it is presumed that goods being transported with TIR carnets would take a shorter time going through customs related procedures. It is also presumed that the cost of customs clearance would be much lower compared to those for goods being transported without TIR carnets. Table 8 contains the results of a t-test comparing the duration and cost of customs clearance for those traveling without and with TIR carnets. These results show that those with TIR carnets would normally take 1.1 hours to go through customs clearance procedures while those without TIR carnets would take an average of 2.9 hours. The TIR transit system results in faster border clearance by eliminating the need for examination. In addition, the TIR carnet is considered sufficient for goods to avoid being required to secure supplementary documentation at every border they pass through. There should also be no requirement for customs convoys for TIR vehicles because potential risk is covered by the guarantee (EU-UNDP BOMCA, 2009).

Meanwhile, goods with TIR carnets are levied less fees to get cleared by customs than those without TIR carnets. On the average, $67, per 20-ton cargo, is paid for goods with TIR carnets while $408, per 20-ton cargo, is paid by those without TIR carnets.



In 2012, the use of TIR carnets proved advantageous when shipments undergo custom related procedures, in terms of cost and time. Data suggest significant overall difference when compared to non-TIR cargoes.

Methodology

Independent samples T-test was utilized in testing the difference of customs clearance cost and duration between cargo transports using TIR and those who do not. This technique is usually used to perform significance test in the means of two independent groups. F-test is also used to test the homogeneity of variance of border-crossing duration data. Sample data in the analysis includes only 2012 TCDs from January to December.

VII. Special Report

Pakistan

Pakistan joined CAREC in 2010, and officially took part in the CPMM beginning 1 January 2011. A midterm review of the CAREC Transport and Trade Facilitation Strategy is expected to realign CAREC corridors so that they include Pakistan formally. Pakistan at the moment is served notionally by Corridors 5 and 6. Located in South Asia, Pakistan offers access to seaports for other CAREC countries. The country has three deepwater seaports handling a total of 64 million metric tons per year. They are Karachi (about 60%), Port Qasim (close to 40%) and Gwadar (almost 10%).

CPMM data showed active transit traffic through Afghanistan to Pakistan. Shipments of fruits and vegetables as well as scrap iron are sent to Pakistan, while Pakistan exports cement to Uzbekistan and Tajikistan through Afghanistan. Pakistan also offers transit routes for shipments going to Afghanistan. The northern route crosses Peshawar-Torkham (PAK-AFG) and the southern route crosses Chaman-Spin Buldak (PAK-AFG). The final destination for the northern route is Kabul or Jalalabad; Kandhar is the principal destination in the south.

	Routes	Distance (km)
1	**Northern Route:** Karachi-Moro-Sukkur-D.I. Khan–Peshawar-Torkham-Jalalabad-Kabul	1,646 km
2	**Southern Route:** Karachi-Khuzdar-Quetta-Chaman-Spin Buldak-Kandhar	1,010 km

Since Karachi is the origin for many shipments going to Afghanistan, it has a systemic impact on the corridor efficiency. Significant delays are observed here. CPMM showed Customs formalities taking 8 to 12 days to complete. The principal cause of prolonged delay was a ban imposed on transit shipments of NATO and coalition forces to Afghanistan, causing such goods (also called non-commercial cargoes) to be diverted by freight forwarders to lanes normally reserved for commercial goods. This caused a surge in the clearance of commercial cargoes, increasing the customs clearance time. To ensure that commercial cargoes do not contain materials under non-commercial cargoes, it is common now to conduct 100% inspection of the containers to ensure that (i) all freight declaration are compliant and (ii) no freight forwarders sneak non-commercial cargoes in commercial containers.

Transit Potential in Pakistan

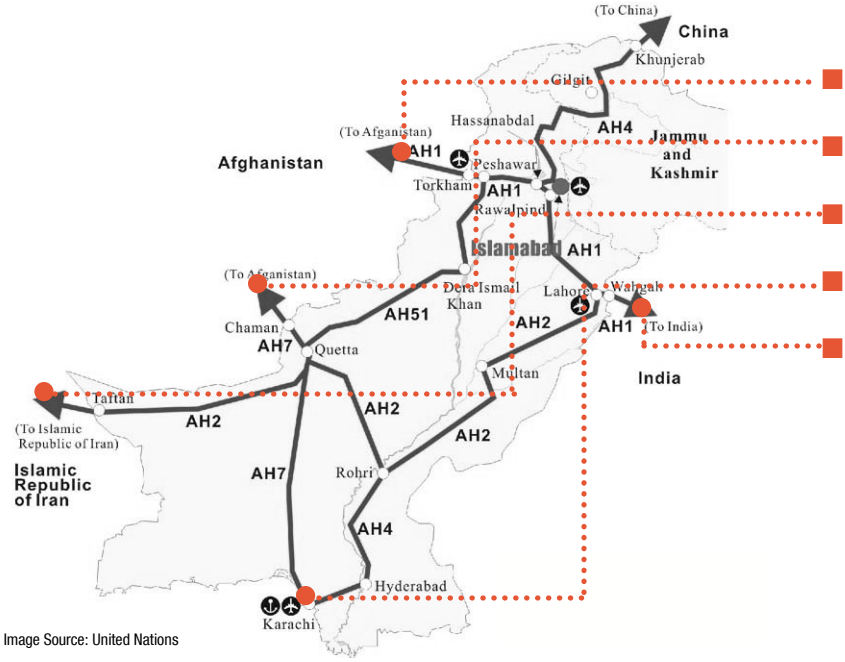


Image Source: United Nations

Asian Highway Routes in Pakistan

- **Pakistan-Afghanistan (AH51), 862km**
  Quetta-DI Khan-Peshawar-Torkham
- **Pakistan-Afghanistan (AH7), 816km**
  Karachi-Kalat-Quetta-Chaman
- **India-Pakistan-Iran (AH2), 1,763km**
  Wagah-Lahore-Multan-Sukkur--Lakpass-Nokundi-Taftan
- **Pakistan-China (AH4), 2,391km**
  Karachi-Lahore-Hasanabdal-Gilgit-Khunjerab
- **India-Pakistan-Afghanistan (AH1), 520km**
  Wagah-Lahore-Rawalpindi-Peshawar-Torkham

For the southern route, trucks have to form up in a convoy at Quetta. The trucks are then escorted to Chaman-Spin Buldak. Typical escort/convoy can take 6 hours and cost USD 153. Since this takes place only in the day time, a truck that arrives after the convoy has left will essentially have to wait until the next day to join the convoy. In addition, shipments carrying oil in tankers are usually given priority in the queue. Desperate drivers who need to send normal cargoes may have to resort to informal payments so that the truck is permitted to join the queue instead of waiting another day. Customs formalities at Chaman and Spin Buldak each range from 24 to 48 hours, with a payment of between USD 200 to USD 300 per shipment collected at each BCP. For the northern route, the escort and convoy takes place at D.I. Khan. This consumed similar time and exacted similar payment at Quetta. The time and payment at Peshawar as well as Torkham were similar too.

Afghanistan and Pakistan have signed a new Afghanistan-Pakistan Transit Trade Agreement (APTTA). This new 2010 version replaced the 1965 version. Tajikistan is reportedly interested to join this agreement. Given the importance of transit traffic for both countries, the agreement is expected to provide a boost for bilateral trade. Nonetheless, supply chain security is an important issue that must be addressed.

In summary, Pakistan exhibits considerable appeal as a transit route for CAREC countries seeking access to a deepwater port. Despite the appeal, the uptake is still limited:

- The significant delay at Karachi has to be shortened. Customs formalities are the main reason for the delay. If expedited, the overall time using this corridor could be reduced.
- For transit traffic, road transporters cannot avoid escort and convoy, either at Quetta or D.I. Khan. Here, much time was spent waiting in queue for convoy formation. Informal payment is also common here for drivers who hope to shorten the waiting time. The escorted convoys move slowly through the challenging terrain.
- Another issue is the limitation of Pakistan Railways. This 152 years old railway is supposed to have 500 engines, but only 150 are working. There is virtually no cargo traffic operating in this railway now, which serves passengers only. The 30 miles section from Peshawar to Khyber Pass is now not in service, due to lack of maintenance.

VIII. Concluding Observations

This third full year of CPMM revealed some emerging trends regarding traffic composition and trade patterns. It also reiterated the impact of unanticipated short-term factors on the measurement of annual performance of CAREC corridors. In 2012, the Customs Union between Kazakhstan, Russia, and Belarus continued to present non-members with challenges that, over time, they were able to manage better than when the challenges first arose. Weather too had its impact, as did politics.

What CPMM does not measure is the economic impact of the phenomena it observes. How do delays in delivering goods to market undermine efforts to eradicate poverty? How do informal payments and spoilage of perishables in transit create price inflation that keeps essential goods such as food unaffordable for many more of the less well-off in CAREC countries than would be the case if corruption ended, delays were minimized, and trade logistics improved? How much more energy is consumed by vehicles waiting for hours simply to return an empty truck to a depot?

Although CPMM does not measure the impact of the phenomena it observes, it performs a valuable service for a variety of stakeholders simply by confirming that these phenomena occur and measuring their toll in time and cost. Other tools are available to measure the economic impact, and these are increasingly being brought to bear. The economic impact of Georgia's trade facilitation reforms are being quantified by calculating the reduction in vehicle operating costs for every hour of reduced delays at BCPs. CPMM provides the information needed to make these calculations for CAREC. This, however, is only a fraction of the impact which impediments to trade have on an economy.

CAREC 2020 calls for trade expansion and improved competitiveness. If the ambitious objectives of CAREC 2020 are to be achieved, decisive, concerted efforts must be made regionally to reduce the economic impact of crossing borders. It is our fervent hope that CPMM can generate the information which CAREC decision-makers need to design and implement reforms that minimize impediments to trade even as they adopt more efficient, modern, proven approaches to protect public health and ensure economic security. ADB and its CAREC development partners stand ready to support CAREC initiatives that maximize gains from trade and share the resulting prosperity with those who drive prosperity and with the economically disenfranchised. Over time, CPMM can document the positive impact of bold reforms and become a source of pride rather than a cause for discomfort. This is the underlying motivation for all of us engaged in conducting CPMM. We hope that the 2013 Annual Report will begin to showcase some positive impacts that can motivate and inspire further efforts to facilitate trade in CAREC.

Appendix 1: CPMM Partner Associations

CPMM partners are essential to the success of CPMM. These organizations are the local associations, which represent the transport and logistics industry. They are specially selected and trained to carry out data collection. The key responsibilities of CPMM partners are to:

- Act as a local point of contact for ADB to conduct the CPMM exercise
- Understand the CPMM methodology
- Organize drivers to use customized drivers' forms for data collection
- Review the completed drivers' forms to ensure data completeness and correctness
- Input the raw data from the drivers' forms into a specially designed CAREC CPMM file (created using Microsoft Office Excel)
- Send completed CPMM files to CAREC

In 2012, the 14 CPMM partners working closely with CAREC include the following:

	Country	Official Names	Abbreviated Names
1	AFG	Afghanistan Association of Freight Forwarders Companies	AAFFCO
2	AZE	Azerbaijan International Road Carriers Association	ABADA
3	KAZ	Union of International Road Carriers of the Republic of Kazakhstan	KAZATO
4	KAZ	Kazakhstan Freight Forwarders Association	KFFA
5	KGZ	Freight Operators Association of Kyrgyzstan	FOA
6	KGZ	Association of International Road Carriers of the Kyrgyz Republic	ASMAP
7	MON	Mongolia National Chamber of Commerce and Industry	MNCCI
8	MON	National Road Transport Association of Mongolia	NARTAM
9	PAK	Pakistan International Freight Forwarder Association	PIFFA
10	PRC	Inner Mongolia Autonomous Region Logistics Association	IMLA
11	PRC	Xinjiang Uighur Logistics Association People's Republic of China	XULA
12	TAJ	Association of International Automobile Carriers of the Republic of Tajikistan	ABBAT
13	UZB	Business Logistics Development Association	ADBL
14	UZB	Association of International Road Carriers of Uzbekistan	AIRCUZ

Appendix 2: CPMM Methodology

The CPMM methodology is based on Time-Cost-Distance framework and it involves four major stakeholders: namely the (1) drivers, (2) CPMM partners/coordinators, (3) field consultants and (4) ADB as CAREC secretary.

Time-Cost-Distance Framework

This framework seeks to track the changes in time (measured in hours or days) and cost (measured in US Dollars) over distance (measured in kilometers). Common transport corridors are selected and data on the three metrics are collected by the driver or a consultant along the route. As the data are entered in a Microsoft Excel spreadsheet, a chart will display the changes of time or cost over distance. Distance occupies the horizontal axis, while time or cost occupies the vertical axis.

Drivers

To ensure that analysis reflects reality, raw data should be collected as close to the source as possible. As such, drivers are the ones targeted to record how long (time) or how much (cost) it takes them to move from origin to destination. The drivers use a localized driver's form to record the data and submit to the CPMM partners.

CPMM Partners/Coordinators

CPMM partners are the organizations selected to implement the project. A specific person is assigned by each partner to lean about CPMM, train the drivers, customize the driver's form, and enter the data into a customized Microsoft Office Excel spreadsheet.

Field Consultants

Two international consultants are involved in the CPMM project. They work with ADB's CAREC Trade Facilitation team to develop the CPMM methodology, and then travel to the eight CAREC member countries to standardize the implementation. They also analyze the aggregated data and draft the quarterly and annual reports.

ADB CAREC Secretariat

Residing in Manila, ADB's CAREC Trade Facilitation team is responsible for collecting and aggregating all the completed Excel files. Using specialized statistical software, the team constructs the charts and tables for the field consultants to analyze.

Sampling Methodology and Estimation Procedures

Each month, coordinators of each partner association randomly select drivers who would transport cargoes passing through the six CAREC priority corridors to fill up the drivers' forms. The data from the drivers' forms are entered into time-cost-distance (TCD) Excel sheets by the coordinators. Each partner association completes about 20-30 TCD forms a month, which are submitted to the international consultants and are then screened for consistency, accuracy and completeness.

The time-cost/distance (TCD) data submitted by partner associations need to be normalized so each TCD sheet can be summed up and analyzed at the sub-corridor, corridor, and aggregate level of reporting.

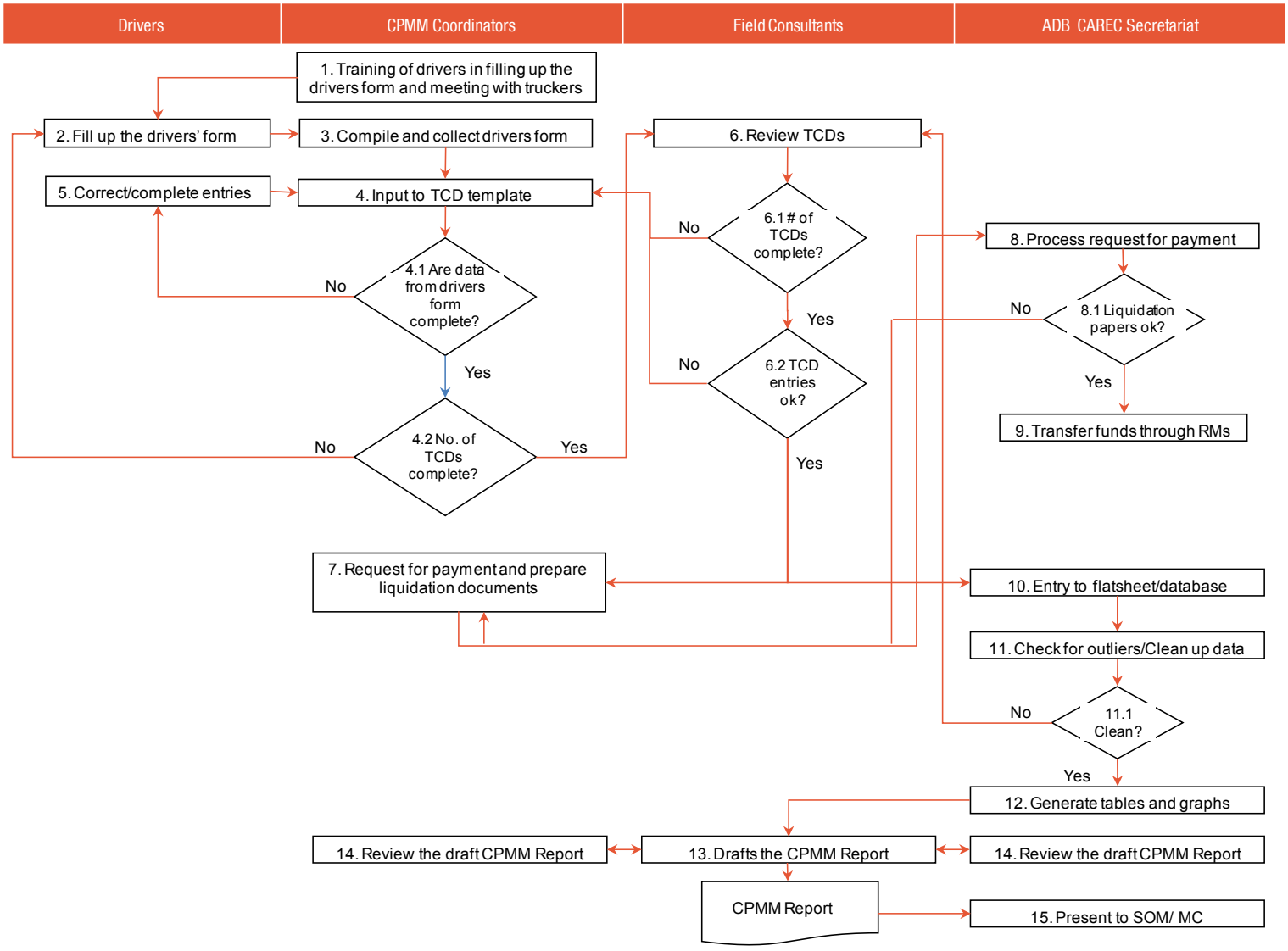
The normalization is done at the level of a 20-ton truck in the case of road transport or a twenty-foot equivalent unit (TEU) in the case of rail traveling 500 kilometers (km). The number of border crossing points (BCPs) on the sub-corridor level is also normalized for each 500 KM segment.

The following are the steps taken for normalization of each TCD sheet:

1. Each TCD is split between non-BCP portion and BCP portion in case the shipment crossed borders.
2. The time and cost figures for the non-BCP portion is normalized to 500 km by multiplying the ratio of 500 km by the actual distance traveled.
3. The time and cost figures for the BCP portion is normalized based on the ratio of pre-determined number of BCPs for each 500 KM segment over actual number of BCP crossed.
4. The TCD is reconstituted by combining the normalized non-BCP portion as well as the normalized BCP portion.

To measure the average speed and cost of transport for trade, the cargo tonnage or number of TEU containers are used as weights (normalized at 20 tons) in calculating the weighted averages of speed and cost for sub-corridors, corridors and overall, based on normalized TCD samples.

Appendix 3: Overview of CPMM Methodology



Appendix 4: Trade Facilitation Indicators — October-December 2012

TFI1 : Time to clear a border crossing point (hours)

In 2012 Q4, BCPs along Corridors 1, 2, and 4 were conspicuously more time-consuming, especially Corridor 2 (averaging 14.5 hours per crossing). Sub-corridor 2a accounted for the most noticeable delay: Tazhen was identified as a major bottleneck. UZB truck owners and drivers reported long waiting time at this KAZ BCP. The high traffic density along sub-corridor 2a and the more stringent Customs inspections since KAZ acceded to the Customs Union were highlighted as some of the contributory factors for the extraordinarily long border crossing time.

TFI2 : Cost Incurred at border crossing clearance ($)

In terms of border-crossing cost, consistent with established patterns, sub-corridors 1a and 1b showed significantly higher costs. The BCP pair Khorgos-Korgas (KAZ-PRC) was reported to be a key reason. Upon further inspection, clarifications with PRC drivers and truck owners pointed to high cost of transport per ton-km in KAZ territory. It was reported that at Khorgos (KAZ), Customs officers referred drivers to 'tolkachi' or 'fixers', who are people at the BCP offering documentation work for drivers at exorbitant fees. If drivers choose not to engage these 'tolkachi', Customs officers would decline to process their documents, leaving drivers stranded at the BCP. These services could cost hundreds of dollars, and this is especially expensive if a driver transports time-sensitive products such as fruits, vegetables, or hazardous materials.

TFI3 : Cost to travel a corridor section (per 500km per 20 tons)

TFI3 reveals wide differences between the transport costs in CAREC. CPMM data collected from PRC road shipments along two different sections demonstrate these differences: (1) Urumqi-Almaty and (2) Urumqi-Dushanbe. To maintain a fair comparison, costs are standardized at 500 km carrying a load of 20 tons. This standardization is required because transport cost depends on distance and tonnage carried.

From the results, it is apparent that the unit transport cost is higher when trucks cover PRC-KGZ-TAJ. This explains why Corridor 5 continued to be the most expensive corridor to traverse in Q4 2012, averaging $1,913 per 500 km. This trend was also observed in previous quarters. Carriers have to charge unusually high carriage cost to offset higher operating expenses that come from navigating difficult terrain along the route.

Aside from Corridor 5, the cost to travel along sub-corridor 1b is also very expensive, averaging $1,811 per 500 km per 20 tons of cargo. Data reveal that the standardized cost for shipments from Urumqi-Almaty is more expensive than Urumqi-Astana. Though both routes incur substantial cost as they enter KAZ territory, passing through Khorgos BCP, rather than Ala Shankou, proved to be more expensive, with a standardized cost of $6,618 per 500 km per 20 ton of shipment. This value is very high compared to other sections.

	Urumqi-Almaty	Urumqi-Dushanbe
Vehicle Operating Cost	$1,995	$2,303
Activities Cost	$558	$582
Total	$2,553	$2,885
SWOD (kph)	47.0	23.3
SWD (kph)	9.6	13.8

TFI4 : Speed to travel a corridor section (kph)

Using the previous example, shipments along Corridor 1 (PRC-KAZ shipments) proved generally faster than shipments along Corridor 5 (PRC-TAJ shipments) in Q4 2012. The mountainous section from Irkeshtan to Karamyk is between 3,500 m to 4,500 m above sea level, greatly affecting the SWOD estimates for Corridor 5. However, due to long border-crossing duration at BCPs, both corridors suffer from a drastic drop in speed estimates. In corridor 1, Customs procedures at Khorgos add substantial delays while in Corridor 5, Karamyk (KGZ) and Irkeshtan (PRC) serve as bottlenecks to shipments.

ADB has facilitated a Cross Border Transport Agreement (CBTA) between KGZ and TAJ. However, Karamyk is (at the moment) a bilateral BCP and KGZ border managers periodically refuse to allow its use for transit shipments. In 2012 Q4, long delays at the Karamyk BCP were observed due to the closure of this border to transit shipments. This reduced the overall speed for shipments along Corridor 5 as truck drivers carrying goods from a third country attempt to cross Karamyk. Furthermore, Karamyk was not designed for heavy traffic despite increasingly heavy usage. Delays could continue to affect the performance of this section and the corridor as long as the regulations and infrastructure do not keep up with the actual traffic situation on the ground.

Appendix 5: Quarterly Estimates

Trade Facilitation Indicators (Quarterly Estimates 2011-2012, Average)

TFI1 Time taken to clear a border crossing point (hr)

	Overall								Road Transport								Rail Transport							
	2011				2012				2011				2012				2011				2012			
Corridor	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Overall	7.6	7.8	7.5	9.0	12.3	11.0	9.6	10.0	5.3	6.6	6.1	6.6	10.5	8.6	7.7	7.8	21.1	17.2	20.2	34.4	25.0	24.6	23.5	25.5
1	12.2	6.9	7.6	8.4	15.7	13.4	12.0	10.8	6.4	5.5	6.0	6.8	15.3	11.3	10.8	7.1	24.7	13.6	20.7	30.3	19.4	25.3	19.0	25.8
2	7.2	7.1	10.0	10.8	8.2	12.6	12.7	14.6	7.2	7.1	10.1	10.9	8.3	12.7	12.7	14.7	4.0	5.3	5.0	4.6	4.4	3.2	3.5	5.0
3	4.5	5.9	5.7	6.2	6.1	8.4	6.2	7.9	4.5	5.9	5.8	6.3	6.1	8.4	6.2	8.0	2.9	5.0	2.3	1.0	4.5	6.5	4.9	4.4
4	7.8	9.6	9.4	14.3	13.6	12.7	11.0	11.3	4.1	4.6	5.1	5.9	5.5	5.4	5.3	5.2	17.4	22.5	20.5	37.1	28.1	25.7	25.8	26.4
5	1.4	12.7	5.3	3.5	19.6	4.0	4.1	8.5	1.4	12.7	5.3	3.5	19.6	4.0	4.1	8.5	-	-	-	-	-	-	-	-
6	5.5	6.5	4.9	5.6	6.7	7.5	9.0	6.6	5.5	6.6	4.9	5.6	6.8	7.6	9.0	6.6	1.4	2.7	3.2	4.1	2.0	3.7	6.8	-

TFI2 Cost incurred at border crossing clearance (US$)

Overall	140	156	169	159	152	156	162	162	138	150	158	146	144	139	152	150	150	208	276	334	262	298	279	273
1	104	145	196	164	168	186	167	181	91	136	180	140	149	144	123	117	130	199	349	719	525	463	451	433
2	131	136	136	167	169	161	168	165	131	136	136	167	169	161	168	165	-	-	-	-	-	-	-	-
3	60	95	90	132	158	182	174	157	60	95	90	132	158	182	174	157	-	-	-	-	-	-	-	-
4	208	190	168	167	132	150	218	206	223	179	143	146	118	141	229	214	181	216	232	227	179	180	168	172
5	89	179	270	235	231	147	117	138	89	179	270	235	231	147	117	138	-	-	-	-	-	-	-	-
6	199	171	105	100	90	91	99	86	199	171	105	100	90	91	99	86	-	-	-	-	-	-	-	-

TFI3 Cost incurred to travel a corridor section (per 500km, per 20-ton cargo)

Overall	915	916	954	1,056	936	882	1,161	1,104	1,011	1,025	1,041	1,137	981	939	1,258	1,190	596	439	455	498	677	639	613	594
1	636	755	798	1,011	993	1,093	1,636	1,066	700	928	869	1,065	996	1,180	1,845	1,131	540	340	478	639	979	844	749	812
2	727	636	598	760	589	545	498	606	728	636	598	762	565	518	468	606	702	634	587	668	1,286	1,662	3,099	-
3	741	985	1,180	1,339	1,053	904	1,102	1,203	750	1,021	1,189	1,380	1,054	877	1,100	1,223	632	233	651	90	936	1,382	1,189	702
4	1,410	1,241	1,162	1,037	919	945	912	961	1,897	1,659	1,652	1,446	1,258	1,301	1,369	1,469	679	613	426	425	411	410	455	453
5	2,033	1,335	1,620	1,672	1,522	980	1,681	1,914	2,033	1,335	1,620	1,672	1,522	980	1,681	1,914	-	-	-	-	-	-	-	-
6	977	904	922	914	765	592	641	908	993	939	939	929	775	603	641	908	551	336	380	443	408	285	-	-

TFI4 Speed to travel on CAREC Corridors (Speed with Delay, kph)

Overall	23.2	20.2	23.0	21.3	23.3	24.1	22.1	19.8	26.2	23.1	25.3	23.8	26.1	26.9	25.4	23.1	19.2	15.2	19.2	17.3	15.3	15.8	11.6	12.6
1	25.9	24.0	27.3	25.0	26.7	22.2	24.5	24.1	30.2	29.9	31.0	28.6	28.8	24.5	27.2	30.7	23.4	18.7	23.6	21.4	19.5	20.5	15.0	17.2
2	24.0	21.9	24.2	21.1	20.7	22.6	25.2	20.6	23.8	21.8	24.1	20.6	20.8	22.4	25.3	20.6	24.8	23.1	25.2	28.0	20.0	25.1	25.0	19.6
3	25.5	21.1	21.7	20.7	20.2	17.7	27.9	24.1	26.3	21.5	20.7	22.1	21.9	18.7	29.0	24.4	22.1	19.0	25.6	18.3	16.0	16.0	17.6	22.0
4	11.7	11.7	11.8	12.0	12.6	13.0	11.0	10.9	20.8	20.8	19.4	19.6	21.0	20.9	20.0	18.5	6.3	6.0	7.0	6.8	6.3	7.1	6.2	7.0
5	26.9	15.8	19.7	20.1	18.4	19.4	14.9	15.9	26.9	15.8	19.7	20.1	18.4	19.4	14.9	15.9	-	-	-	-	-	-	-	-
6	25.7	20.2	23.2	22.5	20.4	29.4	24.9	24.2	25.7	21.2	23.6	23.0	21.5	29.7	25.0	24.2	25.4	16.8	21.9	20.9	14.4	19.1	23.2	25.1

SWOD Speed Without Delay (kph)

Overall	37.5	35.6	40.0	38.9	37.5	37.4	39.4	38.1	44.2	40.3	44.7	43.0	38.3	38.2	42.4	41.7	28.3	27.4	32.3	32.4	35.1	34.8	29.8	30.6
1	42.6	42.8	46.3	46.0	40.3	45.5	41.7	44.8	55.0	52.1	52.5	50.0	39.0	45.7	41.4	45.4	35.2	34.6	40.1	42.0	44.7	45.4	42.5	44.1
2	38.2	34.8	45.2	42.8	39.1	46.5	47.3	39.9	40.1	34.4	45.5	42.8	39.0	46.9	47.4	40.2	28.5	38.4	41.5	43.0	40.4	41.8	44.9	25.8
3	43.1	38.6	42.1	39.3	40.4	40.5	47.1	54.6	45.6	40.0	43.7	43.2	41.2	41.4	48.6	57.3	31.5	32.2	35.2	32.6	38.5	39.0	33.6	34.5
4	22.5	21.2	23.2	23.5	24.1	24.6	19.6	20.9	43.9	40.8	39.8	39.7	36.8	36.0	30.2	29.2	9.7	9.0	12.7	12.5	14.5	16.1	13.9	16.5
5	33.3	27.6	31.4	32.0	29.8	29.7	41.0	32.5	33.3	27.6	31.4	32.0	29.8	29.7	41.0	32.5	-	-	-	-	-	-	-	-
6	37.4	35.9	38.0	35.3	36.3	36.3	47.2	41.4	37.8	36.9	38.7	36.7	36.7	36.3	47.7	41.3	34.9	32.4	35.2	30.9	34.3	37.9	38.1	47.0

Trade Facilitation Indicators (Quarterly Estimates 2011-2012, Median)

TFI1 Time taken to clear a border crossing point (hr)

	Overall								Road Transport								Rail Transport							
	2011				2012				2011				2012				2011				2012			
Corridor	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Overall	3.9	4.6	4.0	4.1	3.9	4.6	4.3	4.0	3.3	4.0	3.5	3.7	3.2	4.0	3.7	3.0	12.0	10.1	14.8	14.4	24.0	24.0	20.0	24.0
1	3.8	3.7	3.0	3.3	2.7	3.6	3.0	2.5	2.0	2.7	2.5	3.0	2.3	2.3	1.8	1.7	7.0	6.0	12.0	22.4	13.0	23.5	16.5	17.0
2	4.7	5.7	7.4	9.5	5.9	6.4	5.8	5.9	4.7	5.8	7.5	9.6	5.9	6.5	5.8	5.9	4.0	4.8	4.7	4.7	3.0	3.1	3.5	5.0
3	3.4	4.5	3.2	3.9	4.2	6.8	5.0	5.2	3.6	4.5	3.3	3.9	4.2	6.8	5.0	5.3	0.8	4.3	2.3	1.0	4.5	5.2	4.9	4.6
4	3.9	5.0	5.1	5.8	6.4	6.7	6.1	6.0	3.2	3.5	4.0	4.1	3.9	4.1	4.6	4.0	12.0	24.0	22.1	12.7	24.0	24.0	24.0	24.0
5	1.2	13.0	3.1	2.9	2.5	2.4	2.1	2.0	1.2	13.0	3.1	2.9	2.5	2.4	2.1	2.0	-	-	-	-	-	-	-	-
6	5.5	4.5	3.1	3.4	2.6	2.4	3.4	1.5	5.5	4.6	3.1	3.4	2.6	2.4	3.3	1.5	1.4	2.1	3.2	4.1	2.0	2.6	6.8	-

TFI2 Cost incurred at border crossing clearance (US$)

Overall	85	99	89	90	73	80	80	79	89	100	82	85	58	65	70	64	50	74	125	200	147	147	145	145
1	50	86	82	68	48	52	35	31	57	87	68	65	45	47	31	28	50	53	150	671	165	164	145	145
2	89	132	143	151	90	90	136	115	89	132	143	151	90	90	136	115	-	-	-	-	-	-	-	-
3	54	59	59	67	75	148	118	75	54	59	59	67	75	148	118	75	-	-	-	-	-	-	-	-
4	72	44	45	45	30	45	52	73	45	15	7	6	10	10	45	45	100	100	100	100	140	140	144	144
5	56	98	111	110	108	134	100	100	56	98	111	110	108	134	100	100	-	-	-	-	-	-	-	-
6	210	160	100	100	90	100	89	65	210	160	100	100	90	100	89	65	-	-	-	-	-	-	-	-

TFI3 Cost incurred to travel a corridor section (per 500km, per 20-ton cargo)

Overall	609	662	623	651	598	630	614	660	670	711	703	709	641	676	676	713	506	350	419	433	452	452	538	583
1	384	449	504	539	522	727	624	624	342	622	518	562	533	727	647	619	442	296	277	272	484	726	383	648
2	457	524	554	523	502	457	436	495	449	522	551	522	502	456	434	495	577	707	554	705	1,344	1,429	3,099	-
3	324	598	774	805	812	759	1,072	974	308	631	774	805	808	719	1,072	1,082	527	198	651	100	936	1,365	1,189	703
4	882	887	794	719	723	741	874	865	1,729	1,440	1,440	1,388	1,301	1,334	1,369	1,406	701	692	448	442	452	452	538	517
5	2,254	892	981	987	1,242	730	2,012	1,825	2,254	892	981	987	1,242	730	2,012	1,825	-	-	-	-	-	-	-	-
6	908	658	612	551	572	509	545	520	921	690	622	553	574	525	545	520	338	359	307	395	343	253	-	-

TFI4 Speed to travel on CAREC Corridors (Speed with Delay, kph)

Overall	23.3	18.4	21.4	19.4	27.3	30.2	25.0	17.1	25.8	22.1	23.6	22.5	29.4	30.2	25.0	21.5	12.8	12.9	13.9	12.9	12.3	10.1	7.9	8.4
1	24.4	19.4	25.3	21.9	29.4	22.6	25.0	20.8	30.7	29.3	30.1	28.9	29.4	23.2	25.0	24.1	18.9	16.0	18.4	18.5	19.6	22.5	14.4	15.3
2	24.2	19.9	25.3	21.3	20.1	21.3	25.2	19.7	23.9	19.4	25.5	20.7	20.3	20.7	25.2	19.8	27.8	20.5	23.3	25.8	20.0	24.1	18.0	19.6
3	26.6	23.7	22.6	19.8	22.6	15.8	25.2	22.6	27.0	23.8	22.6	21.0	23.6	16.2	26.9	21.5	16.3	18.5	24.8	16.0	13.2	13.4	16.9	24.4
4	7.3	7.6	9.0	8.9	8.0	9.3	7.9	7.8	18.6	18.4	17.1	17.2	18.6	20.1	22.8	16.3	6.5	6.0	6.7	6.5	6.2	6.9	6.2	6.6
5	24.7	19.5	20.4	21.8	20.3	19.6	12.1	14.9	24.7	19.5	20.4	21.8	20.3	19.6	12.1	14.9	-	-	-	-	-	-	-	-
6	25.9	20.8	23.1	23.2	19.2	30.2	24.5	24.8	25.8	21.4	23.5	23.8	21.6	30.2	24.5	24.6	27.7	14.1	19.6	12.5	15.9	16.5	28.2	25.1

SWOD Speed Without Delay (kph)

Overall	40.3	35.7	42.9	39.9	35.5	35.2	37.1	37.1	44.6	39.3	45.6	42.3	35.5	35.2	37.1	38.6	33.6	28.8	38.5	34.8	39.9	41.3	36.5	32.3
1	45.5	46.7	46.6	45.6	35.5	45.8	37.1	43.6	56.7	53.3	53.0	50.3	35.5	49.0	37.1	48.6	40.4	37.6	42.8	41.4	44.6	44.4	41.3	43.2
2	41.9	37.1	43.7	43.3	38.8	46.3	48.9	40.5	42.8	34.6	44.2	43.4	38.1	47.7	50.0	40.5	33.9	37.7	40.7	43.3	41.2	41.5	47.3	25.8
3	44.5	37.0	42.6	36.0	36.9	39.3	50.4	40.6	48.6	37.9	43.4	41.9	35.6	38.9	51.3	41.6	35.6	36.0	36.4	32.2	39.0	40.0	32.4	34.2
4	11.0	9.8	16.7	15.8	18.1	21.5	17.4	17.6	47.6	34.0	32.6	37.6	38.2	38.5	31.7	28.0	9.7	8.3	12.0	11.3	15.2	15.3	12.0	15.1
5	30.7	30.1	30.6	31.4	30.3	30.4	31.2	28.1	30.7	30.1	30.6	31.4	30.3	30.4	31.2	28.1	-	-	-	-	-	-	-	-
6	37.2	34.9	37.5	35.5	35.1	35.2	45.5	41.4	39.2	36.4	38.5	38.2	35.1	35.2	46.2	41.4	35.6	30.9	34.3	28.9	34.1	37.9	43.5	47.0

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