CENTRAL ASIA REGIONAL ECONOMIC COOPERATION
TRADE FACILITATION

CARECCPMM
CORRIDOR PERFORMANCE MEASUREMENT & MONITORING

ANNUAL REPORT
2016

CAREC
Central Asia Regional Economic Cooperation Program

Ying Qian
Director,
EAPF, East Asia Department
Asian Development Bank

Yuebin Zhang
Principal Regional Cooperation Specialist,
EAPF, East Asia Department
Asian Development Bank

Dorothea Lazaro
Regional Cooperation Specialist,
EAPF, East Asia Department
Asian Development Bank

Trade Facilitation Team
Max EE Khong Kie
Andy Sze
Maria Theresa Damsani
Loreli De Dios
Lyndree Malang
Julius Santos

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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 in its effort to monitor and evaluate the implementation of the refined CAREC Transport and Trade Facilitation Strategy 2020.

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/.**

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NOTE

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

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Abbreviations

ADB	–	Asian Development Bank
BCP	–	Border crossing point
CAREC	–	Central Asia Regional Economic Cooperation
CPMM	–	corridor performance measurement and monitoring
EAEU	–	Eurasian Economic Union
GIRCA	–	Georgia International Road Carriers Association
km	–	kilometer
kph	–	kilometer per hour
PRC	–	People's Republic of China
SWD	–	speed with delay
SWOD	–	speed without delay
TCD	–	time/cost-distance
TFI	–	trade facilitation indicator
TRS	–	time release study
US	–	United States

Executive Summary

In 2016, corridor performance measurement and monitoring (CPMM) under the Central Asia Regional Economic Cooperation (CAREC) program collected 2,756 shipments samples across Central Asia, using 11 national carrier and forwarder associations in seven[a] CAREC countries. The samples covered road (70.2%), rail (25.9%), and multimodal (3.8%) transport modes traveling across the six CAREC corridors.

Trade Facilitation Indicators

Four trade facilitation indicators (TFIs) specific to CPMM apply to road and rail transport in the CAREC region.

TFI1: Time taken to clear a border crossing point (BCP), in hours. TFI1 took longer for trucks, with time increasing by 21% to 11.3 hours in 2016. The major delays occurred at the Afghanistan–Pakistan, Afghanistan–Tajikistan, and the People's Republic of China (PRC)–Kyrgyz Republic BCPs. Delays in customs clearance and waiting time contributed substantially to higher road TFI1 estimates. On the other hand, the average time for border crossing by rail decreased by 5% to 25.9 hours. CPMM data reveal that further improvements in rail border crossing will depend largely on the availability of wagons.

TFI2: Cost incurred at border crossing clearance, in United States (US) dollars. TFI2 estimates showed modest increases for both transport modes: the cost for trucks to cross one side of the border averaged $160 (7% increase) while that for trains averaged $214 (3% increase). Border crossing costs at Khorgos (outbound PRC at $599), at Shirkhan Bandar (inbound from Afghanistan at $443), and at Irkeshtam (inbound from the Kyrgyz Republic at $343) were above average for the region.

TFI3: Cost incurred to travel a corridor section, per 500 kilometers (km), per 20-ton cargo, in US dollars. TFI3 improved for road and rail. The average transit cost for trucks decreased by 12% to $1,173 and for trains by 23% to $966. Among the road corridors, the steepest drop in TFI3 was observed in the Tajikistan section, which explains the tangible improvements in corridors 3 and 6. Train shipments in both corridors 1 and 4 showed a decrease in average freight rates.

TFI4: Speed to travel on CAREC Corridors, in kilometers per hour (kph). Two measures are used: (i) speed without delay (SWOD) captures the average speed when the vehicle is in motion, and (ii) speed with delay (SWD) captures the average speed taking into account the time spent on border crossing and intermediate stops. A comparison of these metrics allows the estimation of the impact of border crossing operations on total delivery time.

The speed for trucks and trains remained relatively stable compared with their speed in 2015. SWOD estimates reveal that corridor 1 registered the fastest speed (50 kph) while corridor 5 continued to be the slowest (38 kph). Over the years, the speed of trucks along corridor 5 increased substantially, narrowing the gap with that along corridor 1. Meanwhile, SWD estimates averaged 22.3 kph for trucks and 14.3 kph for trains, suggesting lengthy border crossing delays. CPMM data reveal burdensome border crossing operations at 8 out of 17 CAREC subcorridors, consequently lessening by half the speeds gained in road infrastructure improvements, if any.

Corridor Performance

In 2016, shipments along **corridor 1** continue to register the fastest SWOD and SWD averages. Trucks traveled at 50 kph on roads and averaged 32 kph when border-crossing delays were included in the time computation. Over the years, Khorgos (outbound PRC), a gateway for Central Asian goods, demonstrated sustained improvement in border crossing time, which dropped to 7 hours from 45 hours in 2010. In Korgas (inbound Kazakhstan), the same improvement was observed with border crossing time declining from 16 hours to 3 hours since 2010. Huge investments are transforming Khorgos into a well-equipped, efficiently run, and improved dry port.

Alashankou–Dostyk (PRC–Kazakhstan) is an important railway node along corridor 1a. From 2012 to 2016, CPMM data show

a Afghanistan, People's Republic of China, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, and Uzbekistan. Data for Georgia, which became a member of CAREC in 2016, will be collected beginning 2017.

that time and cost of border crossing at this BCP pair displayed a downward trend, signifying improvement. In 2016, data on Khorgos–Altynkol along corridor 1b (PRC–Kazakhstan) were also analyzed. A comparison of the two alternate routes suggests that the border crossing point at Alashankou–Dostyk (PRC–Kazakhstan) is more efficient in time and cost.

Corridor 2 ranks as the second-fastest corridor—SWOD/SWD averaged at 49/23 kph. Samples reveal active traffic at the BCPs in Alat–Farap (Uzbekistan–Turkmenistan), Dautota–Tazhen (Uzbekistan–Kazakhstan), and Irkeshtan–Irkeshtam (PRC–Kyrgyz Republic). Border crossing times averaged 6–7 hours at each BCP. CPMM data show that waiting in queue was the most common cause of significant delay, at times accounting for half of the total border crossing time. A case study of Irkeshtan–Irkeshtam (PRC–Kyrgyz Republic) in the main report provides a more focused discussion.

In this report, CPMM conducted an extensive comparison between the subcorridors of **corridor 3**. On average, trucks along 3a are faster but delays at the border reduce delivery time substantially. Meanwhile, a cost comparison reveals that while border crossing cost is cheaper at BCPs along 3b, transport cost is more expensive because of higher vehicle operating cost, albeit a declining trend as recent data show. Relatively longer border crossing delays averaging 6 to 7 hours at the BCPs in Yallama–Konysbaeva (Uzbekistan–Kazakhstan) and Aul–Veseloyarsk (Kazakhstan–Russian Federation) raised attention.

Similarly, a comparison among the subcorridors of **corridor 4** showed subcorridor 4b to be the costliest and slowest route. At Takeshiken–Yarant (PRC–Mongolia subcorridor 4a), delays have been lengthy and border crossing by road costly. For rail movements, border crossing time and cost indicators improved in 4b despite delays due to the change of gauge operations, over a 3-year period.

Corridor 5 remained the most time-consuming and costly of all corridors. Three principal routes within corridor 5 were analyzed. The first route analyzed the different ways to ship goods from Kashi, PRC to Dushanbe, Tajikistan—shipments were fastest via Karamyk–Karamyk (Kyrgyz Republic–Tajikistan), while the route via Kulma–Karasuu (PRC–Tajikistan) was the cheapest. The report highlighted another route from Kashi to Sost, which is an integral section of the Karakoram Highway along 5b. Over a distance of 513 km, shipments take 2 days to complete because of impediments that compromise the efficiency of the route. The third route is Karachi–Kabul. Long dwell time at the Karachi seaport and lengthy border crossing at the Afghanistan–Pakistan border contributed to the subpar performance of this corridor. In particular, border crossing at Peshawar–Torkham (Pakistan–Afghanistan) and Irkeshtan–Irkeshtam (PRC–Kyrgyz Republic) proved to be lengthy.

In 2016, new samples in 6d allowed all four subcorridors under **corridor 6** to be studied and compared. Shipments of fruit and vegetables from Quetta, Pakistan to Ashgabat, Turkmenistan show long border crossing durations along 6d. These shipments cross Chaman–Spin Buldak (Pakistan–Afghanistan) where delays were significant. Goods were then transloaded onto trains at Towraghondi station, an Afghan BCP at the Turkmen border, contributing to the delay along the route. In terms of cost, border crossing at BCPs along 6c exhibited a noticeable increase due to customs-related fees and unofficial costs at Peshawar–Torkham (Pakistan–Afghanistan). Trucks moving through Shirkhan Bandar–Nizhni Pianj (Afghanistan–Tajikistan) also experienced lengthy delays, reaching up to 60 hours due to the perceived heightened risk of narcotics smuggling of Afghan exports. As a result, Tajik border security agencies are compelled to take precautionary measures and conduct a thorough examination of cargoes.

I. Background

CAREC has been active and remains committed to the Central Asian region. Since its launch in 2006, CAREC Program has built a strong track record of promoting economic cooperation across its member countries and has financed more than $30 billion worth of projects in four core strategic sectors of transport, energy, trade facilitation, and trade policy. In 2013, a review was done and key recommendations were proposed that refines the Transport and Trade Facilitation Strategy (TTFS). Its aim to facilitate transport and trade within and through the CAREC region, providing important links between the world's rapidly growing markets around the region, with focus on the development of six priority corridors, reaffirms the continuous need to measure and assess progress made.

Under this background, CPMM was conceived to quantify actual improvements along the six CAREC Corridors. This methodology is built on UNESCAP's Time-Cost-Distance methodology. A key enhancement was establishing a well-defined list of border crossing activities so that delays could be measured in terms of time and cost. Over time, trends could be identified and bottlenecks located so that policy makers could formulate action plans to address them.

At the operational level, CPMM is implemented in partnership with CAREC Federation of Carriers and Forwarders Associations (CFCFA). One or more associations from each of the CAREC Member countries were invited for training on CPMM methodology. To formalize the relationship, CAREC supported the founding of CFCFA which is the umbrella for all the CPMM participating associations. The members meet once a year on the sideline of the Customs Cooperation Committee meeting to review the results of CPMM and recommend ways to improve transportation and trade facilitation. More information on CFCFA could be found at www.cfcfa.net.

At the beginning, CPMM focused heavily on road transport. This was natural due to two reasons – (i) most national transport associations were related to trucking and (ii) railways transport tend to be operated by a national owned entity with monopolistic characteristics, and data sharing is typically more challenging. As such, road shipments accounted for more than 80% then. However with the renewed focus on railways in the refined TTFS, CPMM has also responded by enlarging rail samples. This mode has now contributed just above 20% of all samples and is expected to increase over time.

Carriage of goods, whether it is by road or railways, tends to meet with 'friction'. This source of 'friction' normally happens due to

- Under-developed transport infrastructure
- Cumbersome border crossing operations
- Unharmonized procedures and documentation
- Unofficial fees and payments

The existence of these problems resulted in high cost and long time for shipping goods in Central Asia. Much research has been done but CPMM is the only study that provides empirical evidence collected by large samples over a period of six years to offer a clear picture on the transport inefficiency commonly witnessed in Central Asia. These details are documented in the following sections. Hopefully they can offer a helpful source of information and insights to the readers.

II. Data Overview

Corridor performance measurement and monitoring (CPMM) is a study of transport and trade facilitation effectiveness in the Central Asia region, collecting data over the years since 2009. The study was made possible through the coordinated efforts of national transport associations in the Central Asia Regional Economic Cooperation (CAREC) region covering the six CAREC corridors. The study covers the different modes of transport including road, rail, and few samples of river crossing.[1] Raw data are recorded by drivers and freight forwarders using customized data collection sheets. A coordinator representing each transport association then collects and verifies the data. Data are entered into standardized spreadsheets and are submitted monthly to international consultants who review and assess the veracity of the values. Upon validation, spreadsheets are sent to the Asian Development Bank (ADB) for aggregation and reporting of findings. Quarterly and annual CPMM reports can be found on the CAREC Federation of Carrier and Forwarder Association website at http://cfcfa.net/.

Data Sample

In 2016, a total of 2,756 samples were collected. A valid shipment record or time/cost-distance (TCD) sample must adhere to the following criteria:

- A TCD is an actual **commercial shipment**. Items that are classified or subject to special procedures (e.g., firearms and ammunitions) are not included.
- Shipments can be either **export, import,** or **transit** in nature. Thus, at least two countries must be involved in the entire journey. Normally, CPMM samples involve trip records across multiple countries because of the landlocked topography of the region and the need to transit countries before reaching the destination country.
- The shipment must pass through **at least one international border crossing point**. CPMM focuses on transit potential and cross-border trade. As such, domestic shipments that do not cross a border are not accepted.
- The journey must traverse along a **CAREC corridor**, or a combination of corridors. However, samples of new routes, not officially along CAREC corridors, but attracting substantial traffic and are popular among transport operators are at times included. Observations of such samples are raised in CPMM for future consideration.
- Time is measured in **hours**, and costs are captured in the local currency and then converted into United States (US) dollars using the prevailing exchange rate to facilitate comparison.

Data Profile

In 2016, records of road shipments accounted for 1,936 (70.2%) samples while rail transport contributed 715 (25.9%) samples. The remaining 105 (3.8%) samples comprise multimodal transport of road–rail combination obtained from Afghanistan and Mongolia. Of the 2,756 samples, 657 (23.8%) carried perishables, mostly by trucks (592 samples or 90%). Shipments that used the Transports Internationaux Routiers (International Road Transport, or TIR) carnets account for 599 (30.9%) records, or 30.9% of total road shipments.

Records of commodities are classified based on the Harmonized System codes. In 2016, the five most commonly moved commodity groups were (i) machinery (23.5%), (ii) agricultural (19.7%), (iii) industrial materials (9.7%), (iv) base metals (8.4%), and (v) beverages (5.7%). Together, these groups account for 67% of all movements.

Cargo Movement

Based on the CPMM samples, cargo movements were clearly documented. The database of CPMM samples over the past few years yields useful insights on the flow of cargoes in CAREC. These insights cannot be so readily gleaned from other date sources: CPMM data is a valuable supplement that allows for a more nuanced understanding of the economic and trade statistics that are available to comprehend trade flows in CAREC region.

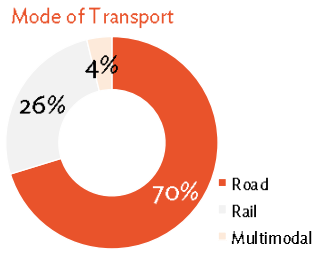
Using CPMM data, cargo movements in each CAREC member country could be summarized as follows:

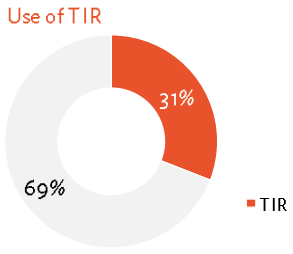
- **Afghanistan**. CAREC corridors 2, 3, 5, and 6 cross

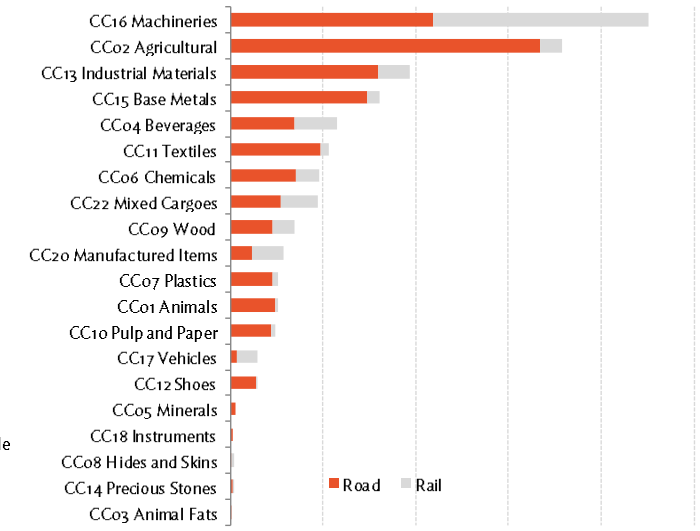
1 River crossing occurs at Hairatan–Termez (Afghanistan–Uzbekistan) along Corridor 6.

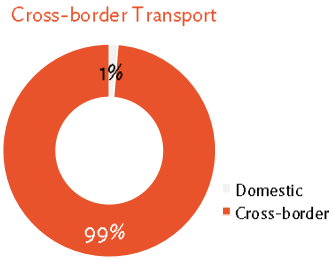
Figure 1: Data Profile and Overview

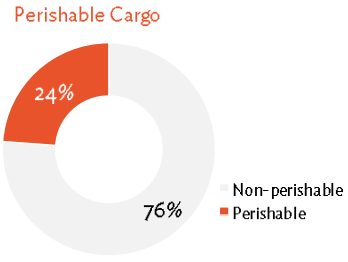
Data Profile



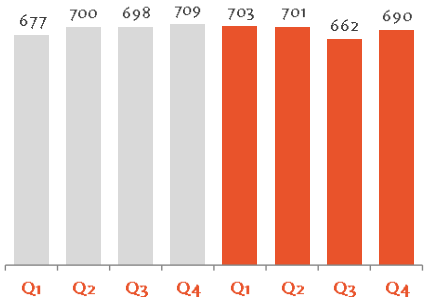








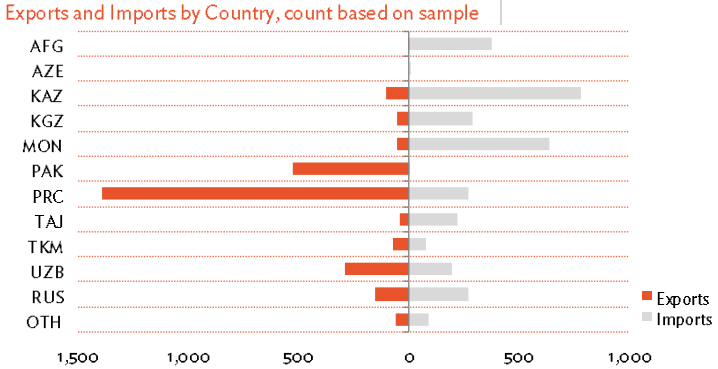
Data Sample



TCD Sample by Association

Country	Association	2016 Q1	2016 Q2	2016 Q3	2016 Q4	2016	2015
AFG	AAFFCO	60	60	80	90	290	240
KGZ	FOA	60	56			116	240
MON	NARTAM	60	60	60	60	240	240
	MNCCI	58	60	57	60	235	225
PAK	PIFFA	60	60	60	60	240	240
PRC	CQIFA	75	75	75	75	300	285
	IMAR	60	60	60	60	240	240
	XUAR	90	90	90	105	375	350
TAJ	ABBAT	30	30	30	30	120	120
	AIATT	60	60	60	60	240	240
TKM	THADA					0	4
UZB	ADBL	90	90	90	90	360	360
Total		703	701	662	690	2,756	2,784

Cargo Movement



Trade Flows

Origin \ Destination	AFG	AZE	KAZ	KGZ	MON	PAK	PRC	TAJ	TKM	UZB	RUS	OTH	Total
AFG				2									2
AZE													
KAZ				43						59			102
KGZ	1		21				1	26			5		54
MON							55						55
PAK	402							78	35	15			530
PRC	99		178	49	572	1		224	61	6	47	156	1393
TAJ				4				36					40
TKM			8	10				38		15			71
UZB			157					76	57				290
RUS				36	60		61						157
OTH							62						62
Total	502		364	144	632	1	179	478	153	95	52	156	2,756

Source: CPMM estimates

Afghanistan. Cargo movements consist mostly of either (i) containerized shipments from the Karachi port in Pakistan, entering Afghanistan through Peshawar–Torkham or Chaman–Spin Buldak; or (ii) transit cargoes from Peshawar into Tajikistan or Uzbekistan across Afghanistan. Starting July 2016, new records include transit shipments of fruits and vegetables from Quetta, Pakistan to Ashgabat, Turkmenistan, crossing Chaman–Spin Buldak (Pakistan–Afghanistan) and Towraghondi–Serkhet Abad (Afghanistan–Turkmenistan). Generally, cargoes are carried along either corridor 5 or corridor 6.

- **Kazakhstan**. CAREC corridors 1, 2, 3, and 6 cross Kazakhstan. The country is an important export destination as well as a transit nation. Trade flows in the country are generally classified either as (i) People's Republic of China (PRC) exports or transit goods (to other countries in Central Asia or Europe) in trucks crossing Khorgos or on trains either via Alashankou–Dostyk or via Khorgos–Altynkol along corridor 1; (ii) container express trains from Chongqing to Duisburg; (iii) shipments of agricultural products from the Kyrgyz Republic crossing Kazakhstan into the Russian Federation via corridor 1c; (iv) shipments of agricultural products from Uzbekistan to Kazakhstan via corridor 3; or (v) transit shipments from Uzbekistan across Kazakhstan into the Russian Federation via corridor 6. Evidently, Kazakhstan's transit potential is immense due to its large geographic area, strategic location, and relatively more advanced transport infrastructure. The Government of Kazakhstan assigns top priority to developing its transit potential. The transition of "KTZ JC NSC" from a railway operator into an integrated logistics is well under way. Moreover, Khorgos is designated as a special economic zone, and the Aktau Seaport is being modernized.

- **Kyrgyz Republic.** CAREC corridors 1, 2, 3, and 5 cross the Kyrgyz Republic. Major cargo movements include (i) agricultural exports sent to Kazakhstan and the Russian Federation via corridors 1 and 3, (ii) imports from the PRC through Torugart destined for Bishkek via corridor 1, and (iii) transit shipments from the PRC to Tajikistan and Afghanistan via Irkeshtan (corridor 5). While shipments though Torugart register relatively fast speeds, significant border delays at Irkeshtan reduce delivery time of goods.

- **Mongolia.** CAREC corridor 4 is primarily a Trans-Mongolian corridor branching out to subcorridors 4a, 4b, and 4c. Section 4b is the north–south corridor connecting Altanbulag and Zamyn Uud and serves as the trunk corridor catering to both road and railway traffic. Cargo movements cover (i) transit shipments by trains carrying lumber from the Russian Federation to the PRC; (ii) containerized cargoes from Tianjin seaport to Ulaanbaatar on trains, crossing Erenhot–Zamyn Uud; (iii) Mongolian exports from Ulaanbaatar to Tianjin in the opposite direction, carrying minerals and cashmere; (iv) containerized cargoes from Chongqing to Ulaanbaatar; (v) trucks carrying crude oil from Mongolian oil fields and building/construction materials to the PRC, as well as consumer goods in the opposite direction from the PRC to Mongolia, through the Zunn Khatavch–Bichigt crossing; and (vi) PRC shipments of consumer goods along 4a (recent addition of records in 2016), where trucks destined for Bayan cross Takeshiken–Yarant (PRC–Mongolia). Considerable delays have always been a problem of trains crossing Erenhot–Zamyn Uud. Moreover, dwell time at Tianjin of goods bound for Mongolia is also significant.

- **Pakistan.** CAREC corridors 5 and 6 extend into Pakistan. Trade flows include (i) containerized traffic from Karachi to Kabul and Kandahar (trucks to Kabul cross at Peshawar –Torkham while those bound for Kandahar cross at Chaman–Spin Buldak); (ii) shipments of building and construction materials from the PRC to Pakistan via Khunjerab along 5b; (iii) export shipments of agricultural products and manufactured items from Lahore to Central Asia, across Afghanistan; and (iv) exports of fruits and vegetables from Quetta to Ashgabat in Turkmenistan across Afghanistan.

  Border crossing delays are considerably lengthy at the Afghanistan–Pakistan border crossing points, often affected by border closures at times. In addition, extensive dwell time at Karachi is expected as a result of the high rate of inspection and examination of goods bound for Afghanistan.

- **People's Republic of China.** East–west corridors 1, 2, 4, and 5 traverse the PRC, from which many shipments originate. Road traffic predominantly crosses Khorgos,

while rail has the option of going through either Alashankou–Dostyk or Khorgos–Altynkol. Major trade flows include (i) exports of containerized goods, mainly consumer merchandise and industrial equipment, carried to Central Asia either by road or rail; (ii) import and export movements from and to Mongolia; (iii) shipments crossing Torugart to Bishkek or transit shipments to other Central Asian destinations crossing Irkeshtan; (iv) exports of containerized consumer goods (including laptops, electronics, textiles) and automobiles/auto parts to Europe on scheduled express container trains; and (v) imports of containerized consumer goods (including wine, milk powder, and luxury goods), luxury autos, and cross-border e-commerce parcels on scheduled express container trains.

- **Tajikistan.** CAREC corridors 2, 3, 5, and 6 pass through Tajikistan. Flows of trade include (i) transit shipments from Turkey via Uzbekistan to Tajikistan; (ii) transit shipments from the PRC to Afghanistan, crossing Karamyk; and (iii) PRC exports of industrial and consumer goods to Tajikistan and Afghanistan, crossing Kulma Pass (this relatively new route is not officially along CAREC corridors, but a popular one among forwarders).

- **Turkmenistan.** CAREC corridors 2 and 6 extend to Turkmenistan. Movements of cargo include (i) road shipments of containerized goods from Bandar Abbas, Iran to Uzbekistan via Alat–Farap; (ii) PRC exports of heavy equipment by trains to Ashgabat; (iii) Pakistan exports of fruits and vegetables from Quetta to Ashgabat in which goods are transported by trucks and transloaded onto trains at Towraghondi in the Afghanistan–Turkmenistan border. Due to limitations of data collection, CPMM does not observe ferry-crossing shipments at Turkmenbashi by the Caspian Sea.

- **Uzbekistan.** CAREC corridors 2, 3, and 6 pass through Uzbekistan. While transport operators are active in moving goods across the region, other countries face limitations in transiting Uzbekistan because of restrictive customs and transit regimes. Major trade flows include (i) containerized shipments between Bandar Abbas and Uzbekistan, Kazakhstan, and the Kyrgyz Republic; (ii) export shipments of fruits and vegetables to Kazakhstan, crossing Yallama–Konysbaeva; (iii) shipments of agricultural products across Kazakhstan into the Russian Federation, crossing Dautota–Tazhen; and (iv) imports from Pakistan crossing Hairatan in Afghanistan.

III. Trade Facilitation Indicators

Table 1: Trade Facilitation Indicators

			2015			2016		
			Mean	Median	Margin	Mean	Median	Margin
TFI1	Time taken to clear a border crossing point (hr)	Overall	13.1	5.6	± 0.5	14.6	5.7	± 0.5
		Road	9.3	4.7	± 0.4	11.3	4.7	± 0.5
		Rail	27.4	23.0	± 1.3	25.9	20.5	± 1.2
TFI2	Cost incurred at border crossing clearance (US$)		161	129	± 3	171	145	± 3.8
			149	125	± 3	160	144	± 3.9
			208	140	± 9	215	150	± 10.6
TFI3	Cost incurred to travel a corridor section (per 500km, per 20-ton		1,323	876	± 37	1,125	906	± 26.3
			1,341	893	± 42	1,174	981	± 30.6
			1,250	823	± 79	966	767	± 49.7
TFI4	Speed to travel on CAREC Corridors (kph)		21.1	19.7	± 1.6	20.1	17.7	± 1.6
			23.2	22.7	± 1.7	22.3	22.4	± 1.7
			14.0	9.1	± 3.5	14.3	9.5	± 3.4
SWOD	Speed without delay (kph)		39.8	41.0	± 1.8	40.9	44.8	± 2.2
			40.2	40.4	± 1.8	41.7	44.2	± 2.4
			38.3	45.0	± 5.0	38.6	45.1	± 5.0

Note: Margin refers to the 95% confidence interval band around the mean estimate.
Source: CPMM estimates

In the private sector, a company manages its performance by using a list of key indicators. Similarly, CPMM applies a specific set of indicators to illustrate the overall annual performance of the six CAREC corridors. This supports time-series comparisons that allow trends to be spotted and improvements to be validated. In CPMM, the four high-level indicators used to monitor and report the impact of transport and trade facilitation initiatives in the region are:

- Time it takes to cross a border 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 of cargo (TFI3)
- Speed to travel along CAREC corridors in kilometers per hour (kph) (TFI4)

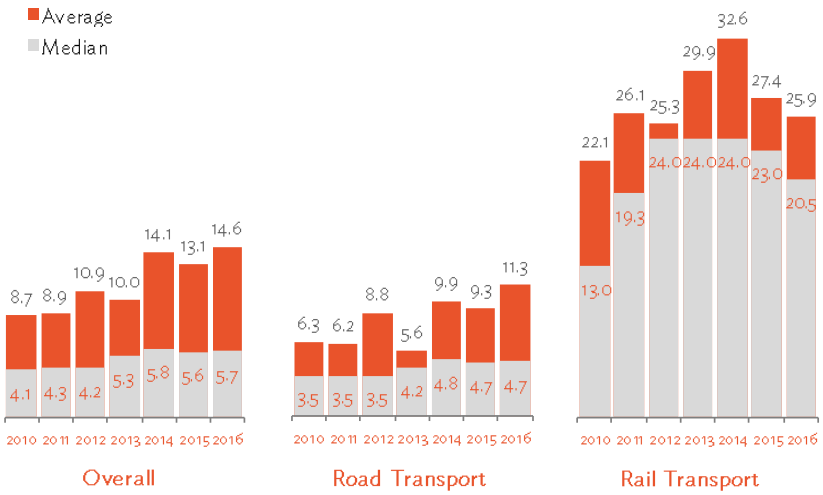
TFI1 Time taken to cross a border-crossing point

in hours

Highlights

- Road border crossing averaged 11.3 hours and rail border crossing 25.9 hours.
- Road transport suffered as longer border crossing time affected the TFI1 estimate by 21%. On the other hand, rail border crossing improved by 5%.
- Major delays in road transport occurred at the Afghanistan–Pakistan border, Afghanistan–Tajikistan, and People's Republic of China–Kyrgyz Republic borders. Customs clearance and waiting time in queue were the main reasons.
- Trains crossing 1a at Alashankou–Dostyk enjoy shorter border crossing time compared with 1b at Khorgos–Altynkol. Availability of wagons contributed to the delay.

Figure 2: Time taken to clear a border crossing point, in hours



Source: CPMM estimates

Border crossing duration by road is substantially shorter than that by trains. In 2016, road border-crossing time increased 21% to 11.3 hours, from 9.3 hours in 2015 (Figure 2), driven mainly by new samples of transit shipments from Pakistan–Afghanistan–Turkmenistan along corridor 6. CPMM partners started collecting data along this route in August 2016. Meanwhile, the duration of border crossing by rail improved to 25.9 hours from 27.4 hours in 2015.

Road Transport

The increased duration in border crossing by road was largely attributed to long delays at border crossing points (BCPs) along corridors 5 and 6. Meanwhile, the BCPs along corridor 3 improved and the rest relatively remain unchanged. Corridors 5a, 5c, and 6d exhibited long delays with average border crossing time of 28 hours, 60 hours, and 41 hours, respectively.

The following border crossing points were responsible for pulling up the average time:

- Chaman–Spin Buldak (Pakistan–Afghanistan)
- Shirkhan Bandar–Nizhni Pianj (Afghanistan–Tajikistan)
- Peshawar–Torkham (Pakistan–Afghanistan)
- Irkeshtan–Irkeshtam (People's Republic of China [PRC]–Kyrgyz Republic)

Waiting in queues and customs controls contributed largely to the total border crossing time (Table 2). The following BCPs suffered from relatively longer waiting in queues: Shirkhan Bandar (60 hours), Chaman (22 hours), Spin Buldak (14 hour), Peshawar (12 hours), and Torkham (11 hours). Lengthy customs formalities occurred at Chaman (35 hours), Spin Buldak (27 hours), Peshawar (27 hours), and Torkham (24 hours).

Rail Transport

In 2016, rail border crossing time dropped by 5% to 25.9 hours as a result of border crossing improvements at BCPs along corridor 1a (which dropped from 32.2 hours to 30.0 hours in 2015) and along corridor 4b (which declined from 20.9 hours to 19.6 hours). Based on additional samples in 2016, TFI1 estimates for corridors 1b and 6d reported border crossing durations at 37.3 hours and 18.8 hours, on average, respectively.

Comparison of routes 1a and 1b suggests that trains along 1a take shorter time to cross borders compared with 1b. At the PRC border, outbound trains at Alashankou (1a) took 20.2 hours compared with Khorgos (1b), which took 22.7 hours. The situation at the Kazakhstan border indicates a wider gap between 1a and 1b—at 1a, inbound trains crossing Dostyk took 44.4 hours, compared with Altynkol (1b) which took 54.0 hours.

In corridor 4, CPMM covers cargo movements from the PRC to Mongolia, and to the opposite direction. When handling outgoing trains, Erenhot and Zamyn Uud average 9.6 hours and 4.4 hours, respectively. On the opposite direction, inbound trains at Erenhot and Zamyn Uud require 45.3 hours and 20.6 hours, respectively. Delays caused by gauge change[2] contributed largely to longer border crossing time. At Zamyn Uud, lengthy waiting time for material transfer, faulty equipment, and shortage of wagons constrain border crossing. New data on transit shipment from Pakistan–Afghanistan–Turkmenistan, which include a train section crossing Towraghondi–Serkhet Abad (Afghanistan–Turkmenistan), show delays caused by inefficient train operation at Towraghondi and resulting in long waiting time for goods inside the train terminal.

Delays in railways are invariably lengthier than those encountered in road transport. Since both transport modes have very different steps at borders, CPMM uses a customized list of activities to measure border crossing operations (Table 2).

In 2016, waiting for available wagons was the primary reason for delays at BCPs, particularly along corridors 1 and 4. This perennial problem is a reflection of the imbalanced trade structure observed in the PRC. For instance, Xinjiang province receives train wagons loaded with consumer and industrial goods from coastal cities, which are typically small in volumetric weight but high in value. From the opposite direction, the province receives bulky commodities from Kazakhstan to transport on trains to coastal cities carrying cargoes high in volume but low in value. This puts a strain on train operations as the demand for wagons is not met by the supply of trains bound for coastal cities carrying bulk commodities. In addition, seasonal export patterns compound the problem. During harvest season for agricultural products, shortage of eastbound trains and wagons further delay the delivery of goods. In corridor 4b, the problem is similar as Mongolia imports significantly higher than it exports. In the short term, the problem could be alleviated if bulky commodities are transported by pipelines, particularly in the transport of crude oil.

Waiting time inside train terminals is commonly cited as a major delay, even in the new samples along corridor 6d at Towraghondi–Serkhet Abad. The closed nature of train operations makes it difficult to attribute the total waiting time to a specific operation. Nonetheless, the duration spent on the activity slightly declined from 13 hours in 2015 to 11.4 hours in 2016.

2 The PRC uses the international gauge (1,435 millimeters [mm]) while most Central Asian Republics, including Mongolia, adopt the broad gauge (1,520 mm). According to the convention in the Organisation for Cooperation between Railways (OSJD), railway gauge-change operation must occur at the destination country. For example, for a train from the PRC into Kazakhstan (or Mongolia), gauge-change operations take place in Kazakhstan (or Mongolia).

Table 2: Duration of Activities spent on BCPs

		Count							Average, in hours						
			Corridors							Corridors					
	ROAD TRANSPORT	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A.	Border Security / Control	3,942	409	393	403	972	638	1,127	0.5	0.1	0.7	0.5	0.4	0.6	0.7
B.	Customs Clearance	4,324	171	420	297	990	1,218	1,228	7.1	1.7	1.3	1.3	1.2	17.6	5.5
C.	Health / Quarantine	2,240	75	110	225	930	335	565	0.4	0.9	0.4	0.3	0.5	0.3	0.3
D.	Phytosanitary	1,911	-	232	327	360	319	673	0.4	-	0.4	0.4	0.3	0.3	0.4
E.	Veterinary Inspection	879	-	9	180	-	314	376	0.3	-	0.4	0.3	-	0.3	0.3
F.	Visa/Immigration	1,813	192	98	184	480	376	483	0.3	0.2	0.6	0.3	0.0	0.4	0.4
G.	GAI/Traffic Inspection	581	49	10	22	360	36	104	0.3	0.1	0.2	0.2	0.3	0.4	0.3
H.	Police Checkpoint / Stop	1,124	45	159	190	-	281	449	0.3	0.1	0.3	0.3	-	0.3	0.4
I.	Transport Inspection	1,026	63	64	278	-	-	621	0.4	0.9	0.4	0.3	-	-	0.4
J.	Weight/Standard Inspection	2,344	237	353	195	540	354	665	0.4	0.4	0.5	0.4	0.3	0.5	0.5
K.	Vehicle Registration	1,621	54	180	160	495	314	418	0.4	1.4	0.4	0.2	0.3	0.4	0.4
L.	Emergency Repair	56	-	-	-	-	54	2	0.7	-	-	-	-	0.7	1.3
M.	Escort / Convoy	1	-	-	-	-	1	-	3.0	-	-	-	-	3.0	-
N.	Loading / Unloading	1,181	50	31	80	409	149	462	2.1	3.5	3.6	0.7	1.1	3.3	2.5
O.	Road Toll	963	-	112	4	237	316	294	0.4	-	0.5	0.7	0.2	0.4	0.5
P.	Waiting/ Queue	2,801	144	385	183	354	959	776	6.9	0.9	2.9	4.5	0.5	14.1	4.6
	RAIL TRANSPORT	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A.	Load Cargoes	7	7	-	-	-	-	-	3.3	3.3	-	-	-	-	-
B.	Unload Cargoes	61	61	-	-	-	-	-	3.4	3.4	-	-	-	-	-
C.	Fix Cargo Shift	17	-	-	-	17	-	-	1.5	-	-	-	1.5	-	-
D.	Remove Excess Cargo	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E.	Transload at Gauge Change Point	704	456	-	-	248	-	-	9.4	3.1	-	-	21.0	-	-
F.	Pick-up and Deliver Wagons	60	-	-	-	60	-	-	1.0	-	-	-	1.0	-	-
G.	Replace/Repair Inoperable Wagon	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H.	Emergency Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I.	Train Classification	213	196	-	-	17	-	-	3.0	3.0	-	-	3.0	-	-
J.	Document Errors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K.	Reissue Transit Documents	285	67	-	-	218	-	-	1.7	0.6	-	-	2.0	-	-
L.	Customs Inspection	934	585	-	-	281	-	68	2.4	2.8	-	-	1.7	-	1.9
M.	Technical Inspection	3	-	-	-	3	-	-	0.9	-	-	-	0.9	-	-
N.	Commercial Inspection	24	7	-	-	17	-	-	1.5	1.6	-	-	1.4	-	-
O.	Sanitary/Phyto-sanitary Control	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P.	Busy reloading facilities	933	454	-	-	479	-	-	11.4	12.5	-	-	10.4	-	-
Q.	Faulty handling equipment	10	-	-	-	10	-	-	9.0	-	-	-	9.0	-	-
R.	No wagons available	466	449	-	-	17	-	-	24.8	25.0	-	-	18.9	-	-
S.	Restriction on entry	219	202	-	-	17	-	-	19.1	19.1	-	-	19.5	-	-
T.	Marshalling	270	253	-	-	17	-	-	9.8	9.8	-	-	8.8	-	-
U.	Waiting for priority trains to pass	64	64	-	-	-	-	-	15.3	15.3	-	-	-	-	-
V.	For Other Reasons	32	32	-	-	-	-	-	12.1	12.1	-	-	-	-	-

Legend: More than 1 hour

Source: CPMM estimates

TFI2 Cost incurred at border crossing clearance

in $

In 2016, TFI2 estimates rose for both transport modes (Figure 3). Road transport climbed by 7% to $160 while rail transport rose by 3% to $214.

Road Transport

TFI2 estimates rose for corridors 1, 3, 5, and 6 (Table 3). In particular, the increases at corridor 5 (by 28%) and corridor 6 (by 15%) were sharp. Notable increases occurred in inbound traffic at Torkham, Shirkhan Bandar, and at Irkeshtam along corridors 5 and 6. In 2016, new samples of shipments were collected from Urumqi to Khovd, a provincial capital city in western Mongolia, along 4a. Border crossing cost is relatively high at Takeshiken ($222) and Yarant ($224). More information is discussed in the corridor 4 section.

Rail Transport

In 2016, the TFI2 estimate for rail rose to $214. In magnitude, costly corridors include corridor 1b ($372), 1a ($245), 6d ($178), and 4b ($95). At Alashankou–Dostyk (PRC–Kazakhstan) along 1a, the border crossing fee averages $69 and $486, respectively. Compared with 2015, the cost at Alashankou dropped by 23%, while the cost at Dostyk rose by 13%.

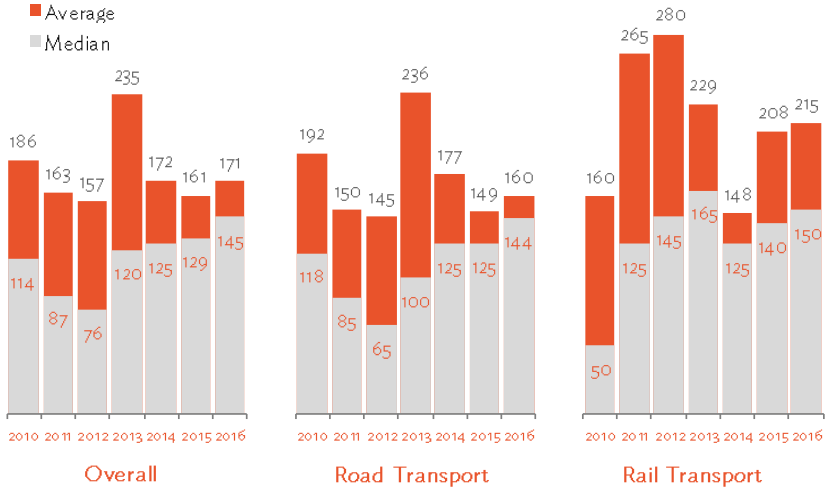
At Khorgos–Altynkol (PRC–Kazakhstan) along 1b, border crossing fees at Altynkol averaged $638, largely because of gauge-change operations and customs inspection at the border. On the opposite side, fees at Khorgos averaged $98. Hence, moving trains from the PRC to Kazakhstan is costlier in corridor 1b.

Samples along corridor 4b include movements in both directions. From Tianjin to Ulaanbaatar, a wide variety of consumer merchandise is carried in 40-foot containers. Border crossing costs $113 and $56 at Erenhot–Zamyn Uud, respectively. In the other direction, for trains carrying Mongolian exports, border crossing costs $267 and $75 at Erenhot and Zamyn Uud, respectively. These results are similar compared with 2015 except for fees at Zamyn Uud for incoming trains, which experienced a reduction of 57% from

Highlights

- The average border crossing costs for road and rail transport modes rose moderately. TFI2 increased to $160 (by 7%) for road, and to $214 (by 3%) for rail.
- For road, cost increase is attributed to higher border crossing fees at Torkham, Shirkhan Bandar, and Irkeshtam along corridors 5 and 6. New samples on 4a were collected, including border crossing data at BCPs in Takeshiken–Yarant (PRC–Mongolia).
- For rail, border crossing costs at BCPs along corridor 1b were found to be most expensive. New samples on border crossing at Towraghondi–Serkhet Abad (Afghanistan–Turkmenistan) along 6d were collected.
- Fees for customs formalities were costly, followed by weight control, health inspection, visa/immigration, and border security.

Figure 3: Cost incurred at border crossing clearance, in $



Source: CPMM estimates

Table 3: Cost of Activities spent on BCPs

		Count							Average, in $						
			Corridors							Corridors					
	ROAD TRANSPORT	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A.	Border Security / Control	2,730	210	248	298	480	566	928	19	10	14	14	25	17	21
B.	Customs Clearance	3,675	122	244	298	750	1,218	1,043	104	211	22	30	96	164	69
C.	Health / Quarantine	1,909	74	77	227	678	349	504	15	125	10	6	13	8	11
D.	Phytosanitary	1,308	-	127	278	60	319	524	9	-	10	8	3	7	12
E.	Veterinary Inspection	876	-	5	204	-	314	353	8	-	5	5	-	8	10
F.	Visa/Immigration	1,081	48	103	208	-	339	383	40	16	78	6	-	56	36
G.	GAI/Traffic Inspection	190	49	-	16	-	36	89	6	7	-	8	-	6	6
H.	Police Checkpoint / Stop	854	45	90	73	-	281	365	7	4	4	6	-	8	9
I.	Transport Inspection	1,010	63	59	277	-	-	611	13	18	24	10	-	-	13
J.	Weight/Standard Inspection	1,628	233	243	40	240	354	518	30	11	13	15	23	73	22
K.	Vehicle Registration	1,144	52	142	220	2	314	414	5	5	8	5	1	4	6
L.	Emergency Repair	54	-	-	-	-	54	-	19	-	-	-	-	19	-
M.	Escort / Convoy	104	-	-	-	-	1	103	109	-	-	-	-	73	109
N.	Loading / Unloading	939	48	-	72	313	146	360	100	321	-	80	117	58	77
O.	Road Toll	1,259	-	112	4	522	327	294	54	-	157	167	8	76	68
P.	Waiting/ Queue	66	48	-	-	15	3	-	5	4	-	-	9	7	-
	RAIL TRANSPORT	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A.	Load Cargoes	7	7	-	-	-	-	-	229	229	-	-	-	-	-
B.	Unload Cargoes	61	61	-	-	-	-	-	125	125	-	-	-	-	-
C.	Fix Cargo Shift	17	-	-	-	17	-	-	15	-	-	-	15	-	-
D.	Remove Excess Cargo	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E.	Transload at Gauge Change Point	683	456	-	-	227	-	-	226	288	-	-	102	-	-
F.	Pick-up and Deliver Wagons	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G.	Replace/Repair Inoperable Wagon	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H.	Emergency Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I.	Train Classification	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J.	Document Errors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K.	Reissue Transit Documents	61	-	-	-	61	-	-	19	-	-	-	19	-	-
L.	Customs Inspection	687	585	-	-	34	-	68	117	125	-	-	81	-	65
M.	Technical Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N.	Commercial Inspection	24	7	-	-	17	-	-	95	92	-	-	97	-	-
O.	Sanitary/Phyto-sanitary Control	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P.	Busy reloading facilities	1	-	-	-	1	-	-	5	-	-	-	5	-	-
Q.	Faulty handling equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R.	No wagons available	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.	Restriction on entry	53	53	-	-	-	-	-	21	21	-	-	-	-	-
T.	Marshalling	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U.	Waiting for priority trains to pass	-	-	-	-	-	-	-	-	-	-	-	-	-	-
V.	For Other Reasons	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Legend: More than US$100

Source: CPMM estimates

$133 because of lower fees for gauge-change operations and customs inspection.

Data on trains carrying fruits and vegetables along 6d crossing Towraghondi–Serkhet Abad (Afghanistan–Turkmenistan) were introduced in July 2016. Border crossing fees averaged $299 in Towraghondi and $50 at Serkhet Abad, mainly accounting for customs inspection fees.

In 2016, fees to load cargoes onto trains took the top spot in terms of cost. CPMM data reveal a noticeable difference in the loading costs between containerized and non-containerized cargoes for rail transport. In previous years, rail shipments of mainly 40-foot containerized cargo along corridor 1 were collected. Recent efforts to observe non-containerized traffic, which is prevalent in Central Asia, started in 2016. This shift from collecting data on containerized rail shipment to non-containerized contributed largely to the increase in the average border crossing cost. For instance, at Urumqi, the cost for loading a 40-foot container averages $53 while loading onto non-containerized trains, with much higher payload of between 45 tons to 60 tons, range in costs from $226 to $235. Cost for other activities remained relatively constant.

Unofficial Payments

CPMM continues to monitor unofficial payments in CAREC. Unofficial payments are defined as excess payments on top of what is stipulated by law, so that carriers can enjoy some type of benefits such as expedited processing of documents, waiver of penalties, or jumping queues to avoid long waiting time. By determining what is nonofficial from total payments, CPMM is able to measure the extent of such payments along CAREC corridors (Table 4).

Payment of unofficial or facilitation fees to complete a shipment is a widely known practice even in Central Asia. CPMM collects data on unofficial payment from transport operators who conduct the shipments. Data are then analyzed by comparing the total number of samples for a specific activity ("**count**") with the number of samples that actually report an unofficial payment. This enables the calculation of the "**probability**" or likelihood of an unofficial payment occurring for each activity. These payments depend on a variety of factors, such as the border agency officials, familiarity with the transport operator, or the nature of the cargoes (time-sensitive cargoes like perishables may be more susceptible for such rent-seeking behavior). Another indicator measure in CPMM is the average size ("**cost**") of unofficial payment. This amount varies among transport operators for the same activity. As expected, unofficial fees are more

Table 4: Likelihood of Unofficial Payments

Activity	Count	%	Average
A. Border Security / Control	2,981	22%	19
B. Customs Clearance	4,358	30%	116
C. Health / Quarantine	2,351	26%	19
D. Phytosanitary	1,633	22%	10
E. Veterinary Inspection	1,201	28%	9
F. Visa/Immigration	1,155	12%	39
G. GAI/Traffic Inspection	1,836	0%	6
H. Police Checkpoint / Stop	3,136	0%	6
I. Transport Inspection	1,903	0%	12
J. Weight/Standard Inspection	2,540	27%	25
K. Vehicle Registration	1,376	44%	5
L. Emergency Repair	220	2%	42
M. Escort / Convoy	234	0%	100
N. Loading / Unloading	1,876	0%	92
O. Road Toll	2,857	8%	33
P. Waiting/Queue	69	0%	5

Source: CPMM estimates

prevalent during customs clearance, weight/standard inspection, and health/quarantine.

Quantifying unofficial payment is itself a challenging task, because receipts are never given, and rules are murky. Experienced transport operators are able to estimate the "market rate" for each border crossing activity at different locations. Actual unofficial costs could be several times higher than these numbers reported in CPMM due to the reluctance of some transport operators to report such fees or when drivers do not know the actual cost paid by shippers if the latter interacted directly with the authorities. Invariably, such corrupt practices add a hidden tax on consumers. On the other hand, border agency staff are at times poorly remunerated and work in harsh conditions. Transport operators and shippers also have a role to play. When goods are detained, the "easy way" out is to pay the fine or bribe the officials, where the latter may be cheaper than the formal penalty. Thus, policy makers also need to review unreasonably high tax, duties, and penalties, if necessary.

With the formal membership of Georgia in CAREC, the Georgia Revenue Service's positive experience in eradicating corrupt practices (which have gained worldwide recognition) at border crossing points may prove valuable for other CAREC member countries.

TFI3 Cost incurred to travel a corridor section

in $, per 20-ton, per 500 km

In 2016, the average transport cost (TFI3) for both modes trended lower, continuing the improvement in 2015 (Figure 4). TFI3 for road transport dropped from $1,341 to $1,173 (by 12%). For railways, TFI3 dropped from $1,250 to $965 (by 22%). TFI3 for road transport improved across most corridors. Corridor 3 showed the biggest reduction (by 39%). TFI3 for rail improved due to lower cost of railways transport in corridors 1 and 4, dropping 22% and 33% on a year-to-year basis. Corridor 6 was a new addition in 2016.

Road Transport

Five CAREC corridors showed an improvement in TFI3 in 2016, which is led by corridor 3 (cost declined by 39%) and corridor 6 (by 27%).

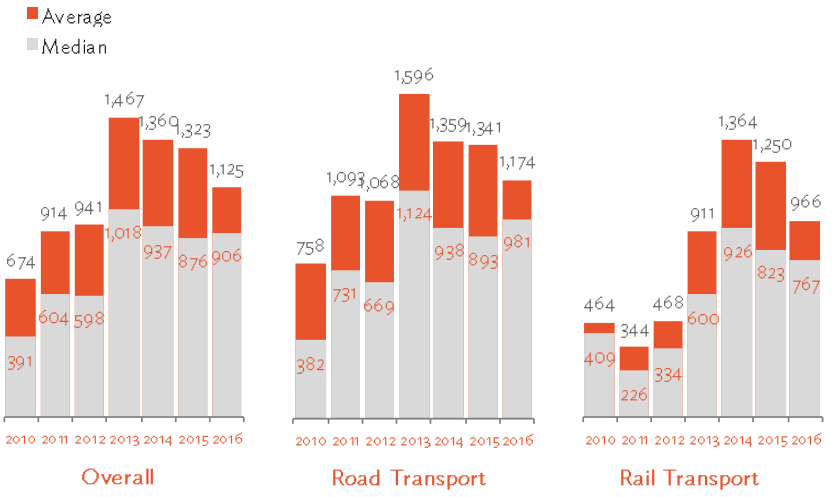
While transport cost in 3a remained stable, the cost in 3b dropped as transport cost in the Tajikistan section of the corridor decreased. Transit shipments from Tursunzade to Nizhni Pianj dropped from $1,000 to $750 per truck, over a distance of 262 kilometers (km). New transit samples from Karamyk to Nizhni Pianj cost $1,100 over a distance of 525 km. Thus, TFI3 (which is standardized to 20 tons over 500 km) is estimated to be approximately $1,052 in 2016, down from $1,743 in 2015. Likewise, for transit shipments from PRC–Tajikistan–Afghanistan, the cost portion in Tajikistan along 6c also had a decrease of 35%. Both TFIs in corridors 3 and 6 were lowered by the decreased trucking costs.

In 2016, CPMM included new samples on 4a. These shipments consisted of items such as the delivery of beverages and industrial materials, as well as less than truckload assortment of merchandise from Urumqi (PRC) to Khovd (Mongolia). The trucks crossed BCPs Takeshiken–Yarant (PRC–Mongolia). The total distance spans 975 km. The estimated transport cost was $1,700, evenly distributed between vehicle operating cost and activities cost. These samples provided new insights on corridor 4a and would be further discussed in the corridor 4 section.

Highlights

- Both transport modes exhibited decline in the recent years. Total cost for road transport averaged $1,173 and $965 for railway transport, declining by 12% and 22%, respectively.
- Road transport cost dropped in five of six CAREC corridors—transport cost in corridors 3 and 6 reduced significantly. Trucking costs in Tajikistan continued to decline. New samples on 4a were also observed.
- For rail, transport cost was reduced in corridors 1 and 4. The latter had a more remarkable improvement as a result of the drop in rail tariffs and border crossing fees. New samples along 6d were also added in 2016.

Figure 4: Cost incurred to travel a corridor section, in $



Source: CPMM estimates

Rail Transport

In 2016, TFI3 for railways performed commendably. The year-on-year change was a reduction of 23%, dropping from $1,250 in 2015 to $966 in 2016. This improvement was led by concurrent reduction in corridors 1 and 4.

For corridor 1, the following observations were made:

- TFI3 for corridor 1a dropped from $1,097 to $859 in a one -year period (by 21%).
- Corridor 1b was a new addition and the TFI3 was estimated to be $803.
- Both subcorridors showed similar levels of TFI3 cost.

For corridor 4, the improvement was more remarkable, showing a 33% drop from $1,565 in 2015 to $1,046 in 2016. This was led by the lower rail tariffs and border crossing fees.

- For trains from Tianjin to Ulaanbaatar along 4b, the rail tariff for a 20-foot container dropped from $2,293 to $2046 (by 10%). The same rate for a 40-foot container dropped from $4,466 to $2,667 (by 40%).
- Border crossing fees also lowered. Border crossing fee for a 20-foot container dropped by 13% while that for a 40-foot container dropped by 24%, on average.

The inclusion of corridor 6 samples for the first time in 2016 revealed interesting findings.

- For trains moving in the Uzbekistan section along 6b, the estimated average railways cost was $823 (standardized at 500 km per 20-foot container). This appeared to be similar to that of the Kazakhstan section along corridor 1.
- Transit goods of fruits and vegetables via train from Towraghondi to Ashgabat were costly. The TFI3 for this shipment 6d was $1,981.

TFI4 Speed to travel on CAREC corridors

in kph

CPMM measures two types of speeds: (i) speed without delay (SWOD) measures the speed of the vehicle moving from origin to destination when in motion. This measurement excludes any stoppage time along the journey such as delays at border crossing. When transport infrastructure and equipment are excellent, vehicles can move rapidly. Paved roads, electrification of railway tracks, and more powerful locomotives facilitate higher speed of travel; (ii) speed with delay (SWD) measures speed including the delay time, such as border crossing duration in the journey. When computing the SWOD and SWD for a shipment moving from origin to destination, SWD is always equal or lower than SWOD. TFI4 reports SWD, but also provides SWOD data.

In 2016, TFI4 showed a slight reduction in speed for road transport (by 4%) to 22.3 kph, while rail transport enjoyed an increase (by 4%) to 14.3 kph (Figure 5). Note that these speeds included border crossing time. If one excludes the border crossing time, the moving speed (SWOD) for trucks was 41.7 kph and for trains 38.6 kph. The comparisons of SWOD and SWD show clearly that lengthy procedures of inefficiencies in border crossing activities do affect overall speed. On the other hand, time release studies[3] reveal that Georgia has succeeded in implementing reforms that has enabled trucks to cross border points in minutes—compared with trucks in Central Asia taking hours or even days to cross. Border delays for trains were even more pronounced, based on the analysis on TFI1.

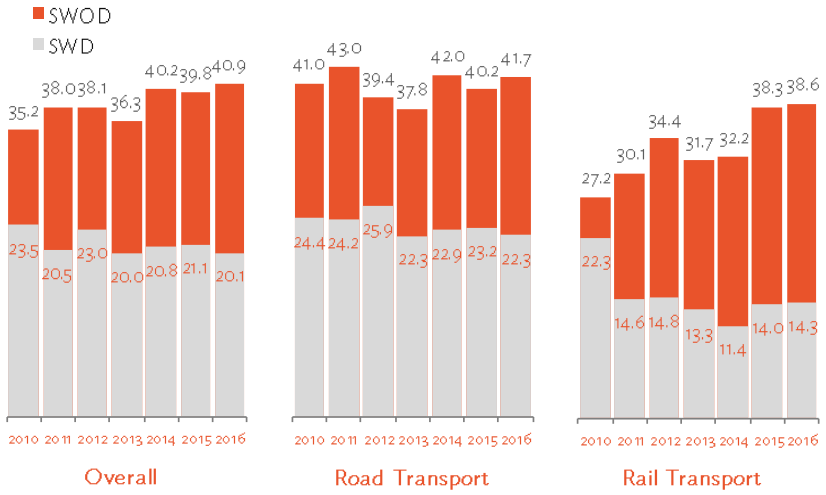
Road Transport

Corridor 1 was the fastest corridor (50 kph), followed closely by corridor 2 (49 kph). Corridor 5 (38 kph) was the slowest, behind corridor 6 (39 kph). These speeds represent the average moving speed of trucks on roads. When border crossing delays are taken into account, this speed (also known as SWD) showed significant drops. Corridor 1 retained the top spot at 32 kph, followed by corridor 3 at 27 kph. The slowest route was corridor 5 at 12 kph, followed by corridor 6 at 23 kph (Figure 6 and Figure 7).

Highlights

- Average speed with delay (SWD) for road was estimated to be 22.3 kph (by 4%) and rail increased to 14.3 kph (by 4%).
- Corridor 1 was the fastest road corridor, while corridor 5 remained the slowest, although improvements were observed in 2016 compared with previous years.
- Border crossing delays resulted in more than 50% reduction in the speed of 8 out of 17 subcorridors.

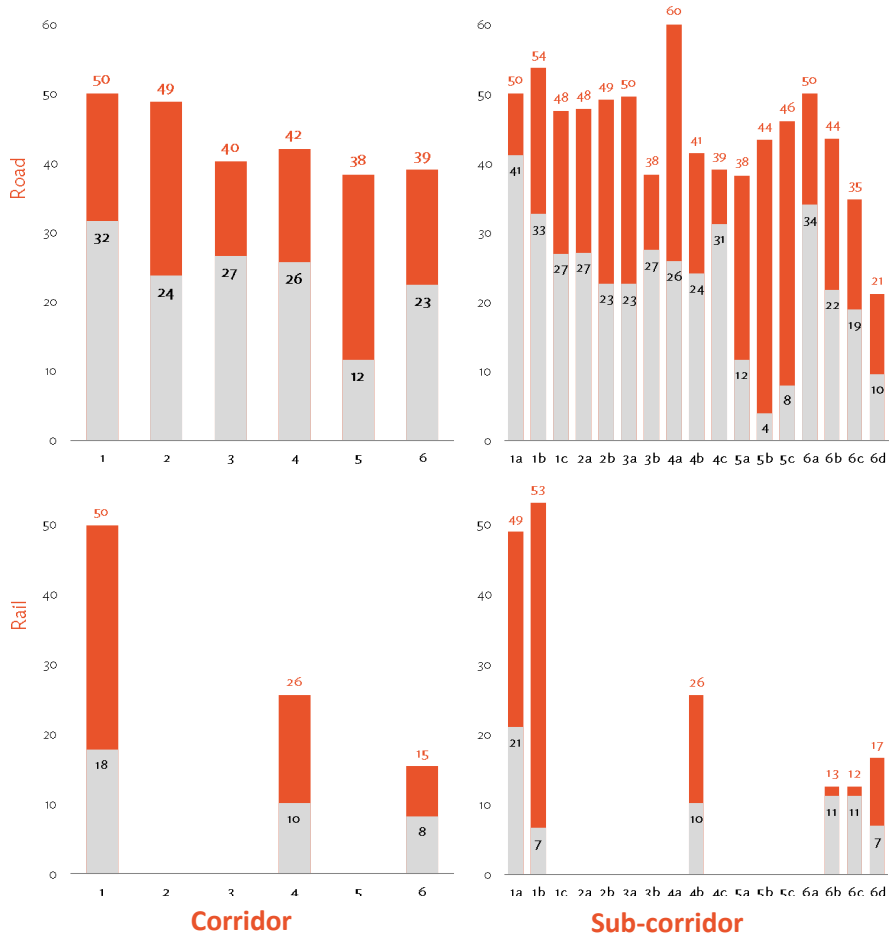
Figure 5: Speed to travel on CAREC corridors, in kph



Source: CPMM estimates

3 Georgia joined CAREC in October 2016. The country completed two time release studies – in 2013 and 2016.

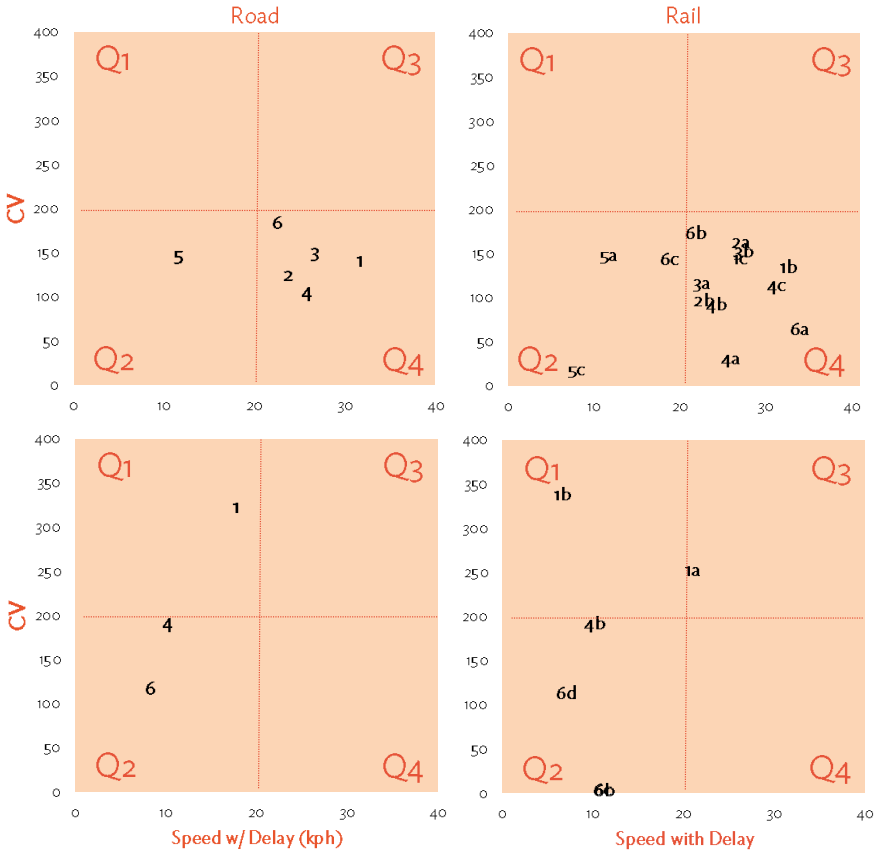
Figure 6: Speed Indicators for Road and Rail Transport, in kph



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.

Figure 7: Variation in Speed Estimates



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. 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 goods 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.

The lengthy and inefficient border crossings remain a challenge. It is worrisome to note that border crossing severely impedes the rapid movement of cargo flows in the CAREC region.

The CAREC Program is committed to improve transport and trade facilitation in the region. Despite the challenges, some progress in these two areas has been noted.

In transport, road rehabilitation and construction can help to increase vehicle speeds. Corridors 4 and 5 used to be the slowest corridors, but the SWOD for both corridors have gradually increased over the past 5 years.

The road from Zamyn Uud to Choyr along corridor 4 was constructed in 2014 (under a project funded by ADB). Consequently, CPMM captured an immediately observable jump in SWOD in that year. Another major effort is the road rehabilitation and construction in Afghanistan, the Kyrgyz Republic, and Tajikistan, all key transit countries in corridor 5. As a result, average vehicle speeds moved from the low 30s to the high 30s now.

In trade facilitation, CAREC created platforms such as the Customs Cooperation Committee that meets annually and forms collaborative efforts in six key directions. Such initiatives have resulted in bilateral or multilateral cooperation that can streamline procedures, harmonize standards, and simplify workflow.

An effective effort was the bilateral cooperation between the PRC and Mongolian Customs. CPMM detected an improvement in the border crossing time at Erenhot–Zamyn Uud (PRC–Mongolia). The reduced border crossing time invariably increased SWD estimates.

Rail Transport

In 2016, CPMM covered shipments by railway on corridors 1, 4, and 6 (new addition). Trains on corridor 1 moved fastest with an SWOD of 50 kph, followed by corridor 4 with an SWOD of 26 kph. Trains in the corridor 6 section cover Afghanistan to Hairatan and Afghanistan to Turkmenistan where the SWOD was 15 kph.

The similar levels of SWODs for corridors 1a and 1b suggested that the trains moved at similar speed close to 50 kph. However, the SWD showed a different story. The speed of both trains crossing 1a and 1b had sizeable drops, but the decrease was more pronounced at Khorgos–Altynkol (PRC–Kazakhstan). New data showed that ”restriction upon entry” was the main reason for the 23-hour delay at Khorgos. At Altynkol, the key delays were caused by “no wagons available” (23.2 hours) and ”restriction upon entry” (23.9 hours).

Corridor 4 samples covered shipments moving in both directions between the PRC and Mongolia. The train infrastructure in Mongolia was built during the Soviet times. The railway network requires upgrading and more tracks to handle more traffic. Because of the economic slowdown in recent years, the train traffic throughput has placed less strain on the infrastructure. However, a time will come when the volume of goods will test the limits of the railway infrastructure. Currently, Zamyn Uud is facing a shortage of wagons, which has become a leading reason for goods stalled at that BCP.

C1 Corridor 1
Europe–East Asia

Connecting Europe to East Asia, corridor 1 (Figure 8) is a multimodal route consisting of 13,600 kilometers (km) of roads and 12,000 km of railway across three countries: Kazakhstan, the Kyrgyz Republic, and the PRC. This corridor has three subcorridors: (i) corridor 1a is predominantly a railway corridor, linking East Asia to Kazakhstan, the Russian Federation, and Europe; (ii) corridor 1b supports road and rail traffic via Khorgos, a major BCP, to the Caspian region; and (iii) corridor 1c connects the PRC, the Kyrgyz Republic, and Kazakhstan.

Road Transport

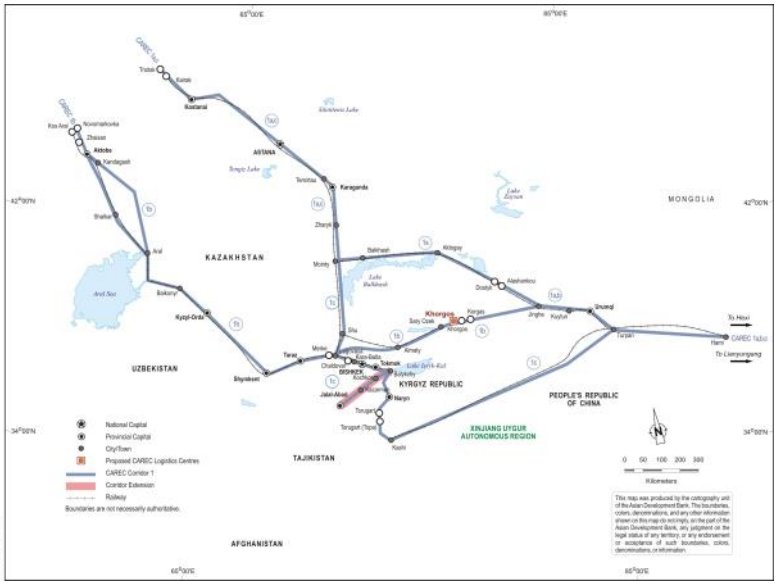
Corridor 1 caters to most active traffic originating from manufacturing hubs in the PRC. Manufactured items, such as consumer and industrial goods, from production hubs (such as the Yangtze River Delta Region and the Pearl River Delta Region) are shipped to Lianyungang and transported to Urumqi in the Xinjiang Uygur Autonomous Region.[4] This provincial capital city serves as a consolidation center for goods bound for Central Asia. Goods cross the border into either Kazakhstan (by trucks or trains) or the Kyrgyz Republic (by trucks only). Roads are generally well-paved and maintained in the PRC. The Khorgos–Almaty section (Figure 9) is also being rehabilitated with new four carriage lanes as part of the "Western Europe–Western China International Transit Corridor" of the World Bank.

Border-crossing points and bottlenecks

Trucks from the PRC traverse either corridor 1a or 1b to enter Kazakhstan. The latter route is preferred by truckers since Khorgos is the largest BCP modernized for such purpose. Although Alashankou–Dostyk (PRC–Kazakhstan) also caters to truck shipments, the BCP is mainly used for rail traffic. In addition, the area near Alashankou is very windy, making winter hazardous for truck logistics operations compared with that in Khorgos.

Figure 10 exhibits the trend of road border crossing time at Khorgos (PRC–Kazakhstan). At both sides of the border, the average border crossing time has declined steadily and

Figure 8: CAREC Corridor 1



Source: ADB

significantly. In 2012, the implementation of controls by Kazakhstan Customs following the recent entry into the Eurasian Economic Union (EAEU) resulted in long delays of trucks exiting the PRC. During the time, BCPs and their infrastructure were less developed.[5] In 2016, developments at both sides of the border were in progress: the PRC constructed large wholesale centers, convention halls, and conference facilities, while BCP facilities at the Kazakhstan side were also modernized with X-ray chambers, modern warehouses, and more efficient controls such as "safe packets" were adopted. Huge investments are directed to build a world-class dry port to facilitate cross-border

4 Lianyungang is the designated official seaport hub for goods to Central Asia. However, with the rise of express container train service, other cities such as Chongqing, Yiwu, Xi'An, and Zhengzhou are also becoming consolidation hubs.

5 Lack of proper temporary storage facilities at the border is often cited as the main factor for long delays by Kazakhstan logistics operators in Almaty in a meeting in October 2013.

Figure 9: Road Segments along Corridor 1

An example of dirt track road common in Kazakhstan.

Modern asphalt paved road along corridor 1b, connecting Almaty to Khorgos

Proper road signs indicate distance, road convergence, and turns. A road shoulder at both sides allows vehicles to stop without obstructing traffic.

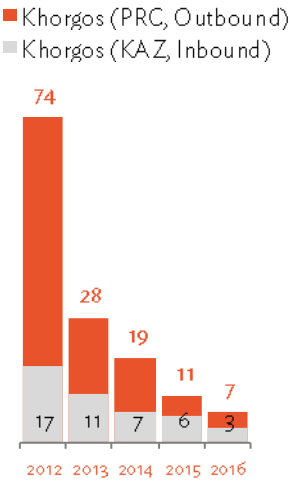
A delivery truck carrying goods from Khorgos back to Almaty along corridor 1b, spanning a distance of about 338 kilometers. This road is being modernized to support higher traffic flow.

Note: Photographs taken by the CPMM team during a mission to Khorgos (Kazakhstan) dry port in April 2016

shipments connecting the PRC and Europe through Khorgos.

No major delays were recorded in other BCPs along corridor 1—no major problems were observed at Torugart (PRC–Kyrgyz Republic); a smaller BCP, Kairak, located near Khorgos showed no bottlenecks; there is no customs control at the BCPs in Kordai–Ak Tilek (Kazakhstan–Kyrgyz Republic) as both countries are signatories of the EAEU. [6]

Figure 10: Average Border Crossing Time at Khorgos, in hours



Source: CPMM estimates

6 The Kyrgyz Republic still encounters several issues since its accession to the EAEU. Although data show smooth operations "at the border," various issues are still encountered "behind the border," which is beyond what CPMM can measure and assess (see Box Story 1 for more information).

Box 1: Impacts of the Eurasian Economic Union on the Kyrgyz Republic

Background

The Kyrgyz Republic became the fifth country to join the Eurasian Economic Union (EAEU) on 12 August 2015. Since then, customs controls were eliminated at the borders to other EAEU member countries. Removal of phytosanitary inspections followed on 19 November 2015. At the border crossing points (BCPs), only border security and veterinary controls remain operational. Such integration will enable the country to further increase exports and maintain its market access to the Russian Federation and to Kazakhstan. According to the agreement, the Kyrgyz Republic will receive 1.9% of the total customs revenue of the EAEU, which translates to a projection of 1.5 times of the country's current revenue.

Positive Benefits

- **Easier border crossing**

  Trucks with cargoes could now cross borders, such as Ak Tilek–Kordai (Kyrgyz Republic–Kazakhstan) in shorter time, as a result of the removal of customs controls and phytosanitary inspections.

- **Benefits for migrant workers**

  The accession allowed a number of the country's migrant workers in Kazakhstan and the Russian Federation to move more easily to work. They are also afforded the same rights as local citizens in their work environment.

Adverse Impacts

- **Reduced exports**

  The economic sanctions imposed by the European Union on the Russian Federation, and the subsequent currency devaluations of the Russian ruble and Kazakhstan tenge resulted in less aggregate demand for and competitiveness of Kyrgyz exports. The value of the Kyrgyz som did not drop as much, which resulted in more expensive domestic products relative to those in Kazakhstan and the Russian Federation. Hence, real gross domestic product (GDP) declined by 2.3% for the first half of 2016 due to decreased exports.

- **National revenue projection was overoptimistic**

  National revenue slightly increased from Som82 billion in 2014 to Som84 billion in 2015. The revenue gains from the country's accession to the EAEU failed to materialize, contrary to projections.

- **Unilateral and unlawful trade protectionist measures from EAEU members**

  According to the Ministry of Agriculture, Kazakhstan did not waive phytosanitary inspections at its borders as per the EAEU agreement. Shipments from the Kyrgyz Republic were subjected to inspection at the new inspection laboratory and quarantine center put in place at Kordai. The Russian Federal Service for Veterinary and Phyto-Sanitary Surveillance also detained trucks on an ad hoc basis, citing the need to inspect Kyrgyz products. Thus, CPMM data, at times, detect long delays reaching to 5 days or more at the Veseloyarsk BCP along corridor 3.

- **New regulatory barriers in transport**

  Besides anti-trade measures, Kazakhstan also introduced the "transit permission" document to and from third-party countries, e.g., for transit shipments via Kazakhstan, transport operators from the Kyrgyz Republic are required to obtain and pay for this additional document. The Kyrgyz Republic transport operators also reported that transport agencies in Kazakhstan have increased checks on their delivery vehicles, subjecting trucks to multiple checkpoints. This encourages rent-seeking behavior, which consequently increases transport cost for Kyrgyz operators.

- **Disagreement on transit guarantees**

  Transit shipments are typically conducted by qualified international road carriers, who need to register and deposit a guarantee sum to customs authorities. In the Kyrgyz Republic, this sum is approximately $13,000. However, the Russians proposed to put the guarantee deposit at €1 million in EAEU, which caused a widespread concern in the Kyrgyz Republic and received strong opposition from the private sector. Local operators were not as financially equipped compared with their counterparts in the Russian Federation, and such policy could render many Kyrgyz operators out of business. The EAEU members are still negotiating on the guarantee amount.

Sources: (i) Consultative Council with the State Customs Committee of the Kyrgyz Republic on 17 February 2016, where the private sector provided feedback on EAEU issues; and (ii) Presentation by the Chairperson of Freight Operators Association, Temirbek Shabandaliev, at the Central Asian Trade Fair in Almaty, September 2016.

Rail Transport

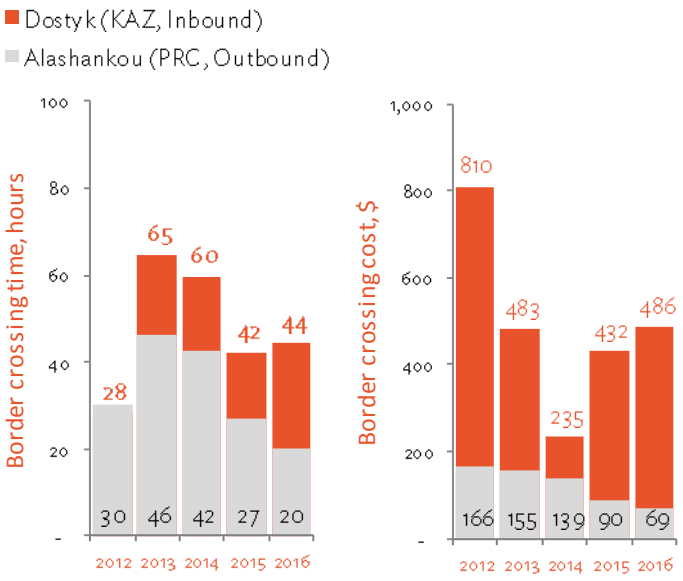
CPMM monitors border crossing performance, in terms of time and cost, of Alashankou–Dostyk along 1a. Figure 11 show the trend of these estimates over a 5-year period.

Findings:

- In general, both border crossing time and cost metrics show a downward trend since 2012.
- Border crossing at Dostyk takes longer and costs more compared with that at Alashankou.
- In terms of delays, the top three contributors at Alashankou include (i) restriction on entry, (ii) marshalling, and (iii) customs inspection. At Dostyk, delays were caused mainly by (i) waiting time in terminals, (ii) restriction on entry, and (iii) lack of available wagons.
- Border crossing cost at Dostyk shows a fluctuating pattern. Cost drivers include (i) gauge-change operations, and (ii) customs inspection. At Alashankou, border crossing fees are considerably smaller and have shown a steady declining trend.

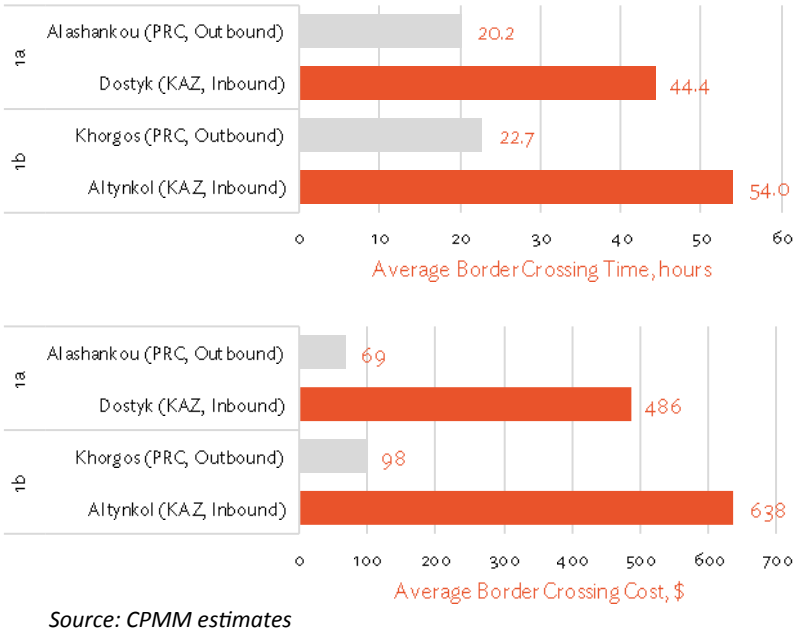
Figure 12 compare the efficiency between BCP pairs Alashankou–Dostyk (1a) and Khorgos–Altynkol (1b). In the following comparison, "total" refers to the sum of border crossing time or cost at both sides of the border. Along corridor 1a, border crossing time totaled 65 hours, compared with 77 hours at 1b. Meanwhile, total border crossing cost is $555 at 1a, compared with $736 at 1b. These metrics reveal that corridor 1a is more efficient than 1b. CPMM will continue to monitor and compare the efficiency of these two routes, which connect the manufacturing hubs in the PRC to Central Asian and European markets.

Figure 11: Average Border-Crossing Time and Cost at Alashankou-Dostyk



Source: CPMM estimates

Figure 12: Comparison of Delays and Costs at Rail BCPs in 1a and 1b

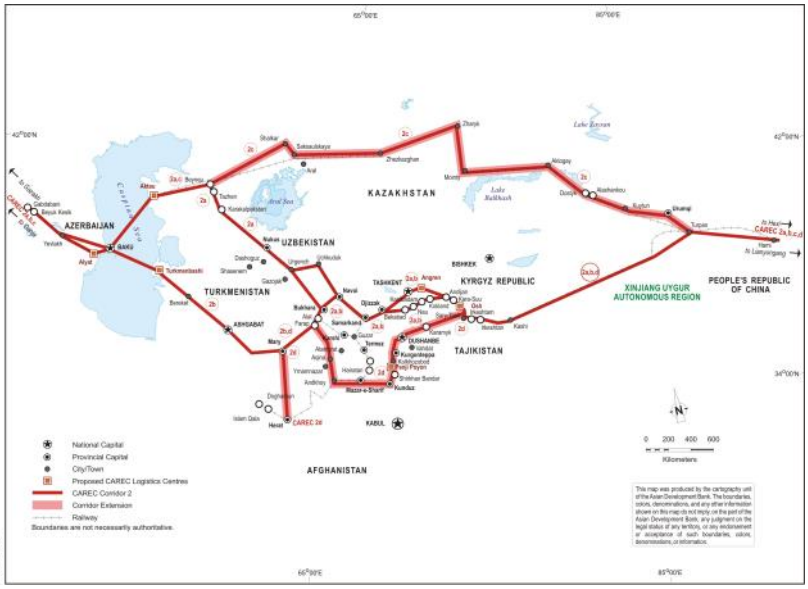


Source: CPMM estimates

C2 Corridor 2
Mediterranean to East Asia

Corridor 2 connects the Caucasus and the Mediterranean to East Asia and crosses seven countries (Figure 13). The corridor's trunk route starts from Turpan to Kashi (a special economic zone) and crosses Irkeshtan (PRC–Kyrgyz Republic). From there, the route splits into 2a/2b and 2d. The 2a/2b section moves northward through the Fergana Valley. At Navoi, this route further splits into 2a where the corridor crosses Tazhen–Dautota (Uzbekistan–Kazakhstan) and moves to Aktau. The route 2b also crosses the Fergana Valley and reaches Alat–Farap (Uzbekistan–Turkmenistan), and ends at Turkmenbashi. Corridors 2a and 2b then re-converge at Baku. Corridor 2c is a northern route from Urumqi and enters Kazakhstan at Alashankou–Dostyk (PRC–Kazakhstan), and connects to Shalkar and Beyneu before continuing to Aktau. Corridor 2d is a southern road corridor that covers the Kyrgyz Republic, Tajikistan, Afghanistan, and Turkmenistan, ending at Turkmenistan. The recent membership of Georgia into CAREC presents the possibility of extending the corridors into its territory.

Figure 13: CAREC Corridor 2



Source: ADB

Road Transport

In 2016, corridor 2 was the second-fastest road corridor with an average speed without delay (SWOD)/speed with delay (SWD) of 49 kilometers per hour (kph)/24 kph (the reduction of 51% suggests significant delays at the borders). Corridors 2a and 2b are actively used by Uzbek transport operators to reach Kazakhstan and Turkmenistan.

Uzbek exports originate from two major groups of cities. The first group is from the eastern cities in the Fergana Valley such as Andijan, Angren, and Kokand. Common products shipped include fresh and dried fruits, as well as vegetables. The second group consists of the western cities of Bukhara and Samarkand where agricultural products are commonly shipped, as well as manufactured items such as clothing and copper wires.

Meanwhile, Uzbek imports from and transit shipments to Central Asia, commonly come from the north and south directions. Trade from the south originates from Bandar Abbas crossing the country at Farap–Alat (Turkmenistan–Uzbekistan). From the north, shipments of industrial equipment and machinery enter Tazhen–Dautota (Kazakhstan –Uzbekistan), carrying goods from St. Petersburg and Moscow.

Border-crossing points and Bottlenecks

In 2016, CPMM observed major trade flows via the following BCPs along corridor 2:

- Alat–Farap (Uzbekistan–Turkmenistan): Uzbek exports, on the average, cross the border at Alat–Farap in 6.2 hours and 7.5 hours, respectively. Imports, on the other hand, take 5.8 hours and 5.4 hours to cross Farap–Alat. At this BCP pair, waiting in queue accounts for at least 50% of the total lead time. Several unofficial payments, albeit involving only a few dollars, were observed. Road toll at the BCPs is comparatively costly at $155 per truck.

- Dautota–Tazhen (Uzbekistan–Kazakhstan): Goods outbound of Uzbekistan are delayed at Dautota and

Tazhen by 6.9 and 7.9 hours, respectively. In the other direction, goods bound for Uzbekistan are delayed by 6.1 and 7.3 hours, respectively. Waiting in queue is the principal cause of delay. Pervasive unofficial payments involving small amounts per transaction were also recorded at the BCP.

- Irkeshtan–Irkeshtam (PRC–Kyrgyz Republic): The BCP pair caters to busy traffic, with 50 trucks crossing per day, on average, which surges to 100 trucks during peak season. The BCP does not operate the entire day (only from 9 a.m. to 8 p.m. in the winter and from 8 a.m. to 6 p.m. in the summer, with a 2-hour lunch break from 12 noon to 2 p.m.). Trade generally flows from the PRC to the Kyrgyz Republic, carrying a wide range of consumer and industrial goods. In 2016, border crossing time at Irkeshtan (PRC) averaged 18.8 hours, largely attributed to the long waiting time, and 5.7 hours at Irkeshtam (Kyrgyz Republic). During a visit to this BCP in April 2016, the CPMM team estimated 50 or more trucks waiting in queue at Irkeshtam (Kyrgyz Republic) to enter, and only 20 trucks returning to the PRC.

Box 2: Border Crossing and Transit Shipments at Irkeshtam, Kyrgyz Republic

At the PRC–Kyrgyz Republic border at Irkeshtam (Kyrgyz Republic) 90% of border crossing accounts for transit shipments while the remaining 10% for imports. Transit goods travel to the Dostuk border crossing point (BCP) to enter Kazakhstan, or via Kyzyl–Bel to enter Tajikistan.

To expedite border crossing, this BCP has instituted the following controls and measures:

- Express crossing for perishables

  Under a bilateral transit trade agreement with the PRC, trucks carrying fruits and vegetables go through the green channel where expedited crossing is ensured. Otherwise, trucks will have to go through the red channel where cargoes are inspected and matched with invoices.

- Electronic pre-declaration

  The Kyrgyz Republic passed a law that requires electronic declaration of goods to be received by Customs 2 hours before the truck arrives at the BCP. This facilitates customs clearance within 30 minutes upon arrival of the shipment, provided there are no errors in the documentation. In practice, 70% of the declarations lodged by customs brokers do not comply with the 2-hour window. One problem is the lack of good electronic data exchange between the customs brokers and their counterparts in the PRC. Hence, data are manually entered, often delaying the declaration.

- Valuation and assessment

  Irkeshtam only conducts customs controls. Actual clearance is done at Karasuu Customs house, near the city of Osh. Customs officers at Karasuu also conduct valuation and assessment if declared values are acceptable, which otherwise cause delays in the release of cargoes.

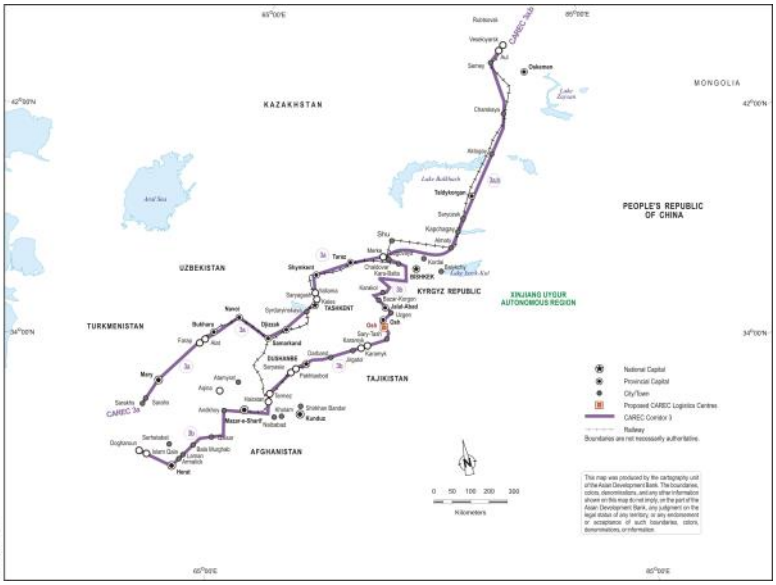
Source: Consultative sessions with Custom Controls officials during a visit to Irkeshtam BCP on 20 April 2016.

C3 Corridor 3

Russian Federation–Middle East and South Asia

Corridor 3 connects the Russian Federation to the Middle East and South Asia, covering six CAREC member countries (Figure 14). The passageway from Veseloyarsk–Aul (Russian Federation–Kazakhstan) to Merke in Kazakhstan forms the trunk of this corridor, facilitating both road and rail traffic. At Merke, corridor 3a extends into Uzbekistan and Turkmenistan. Corridor 3b extends into the Kyrgyz Republic, Tajikistan, and Afghanistan.

Figure 14: CAREC Corridor 3



Source: ADB

Road Transport

A comparison of the speeds of 3a and 3b showed some interesting information (Figure 15). Trucks traveling along corridor 3a registered faster speeds at 50 kph on average, compared with 38 kph for those traveling along 3b. This is largely attributed to better road infrastucture and the flatter terrain in Uzbekistan along 3a. In contrast, corridor 3b passes through the mountainous regions in the Kyrgyz Republic and Tajikistan.

Accounting for border cossing delays, corridor 3b registered faster SWD estimates as a result of shorter border crossing at BCPs along 3b.

Earlier CPMM reports proposed ways to reform transit policy in Uzbekistan which could potentially improve the corridor performance of corridor 3. If the restrictive customs regime in Uzbekistan opens to transit shipments, the effects to border crossing at BCPS along corridor 3a may result in more efficient procedures and faster SWOD/SWD values. This will increase the attractiveness of the country as a transit nation. In 2016, there is potential for Uzbekistan's new administration to open up discussion for more expansive regional cooperation that could subsequently affect transit trade.

Vehicle operating cost accounts for a large portion of total transport cost. Commonly, it comprises costs to cover fuel, parking, and driver's remuneration for the trip. The remainder of the total cost is allotted to activity costs. Aside from activity costs inside border posts, fees incurred during transit are also measured in CPMM. These include sums paid to road tolls, or traffic police, or customs escort and convoy, which normally occur outside of BCPs. Therefore, total transport cost is the sum of vehicle operating cost plus fees incurred for activities, whether inside border posts or otherwise. Figure 16 illustrate the following observations:

- BCPs along corridor 3a have higher border crossing fees.
- Following the total transport cost definition, transport along corridor 3a is less costly due to higher, albeit steadily declining, trucking cost in 3b.

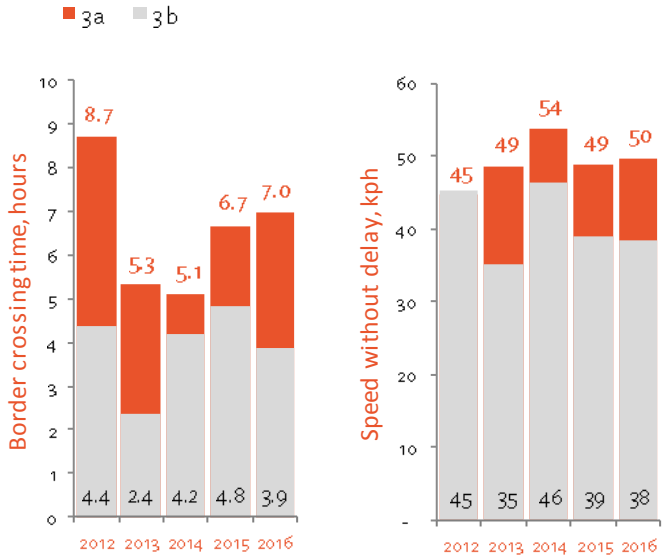
Effectively, transport along 3a is more efficient in terms of time and cost. If Uzbekistan adopts trade facilitation measures, it could attract more trade traffic as a transit nation. Particularly for trades between the Russian Federation and Afghanistan, 3a is a more efficient route, in principle, as trucks need to transit through only two countries, Kazakhstan and Uzbekistan, as opposed to three countries (Kazakhstan, the Kyrgyz Republic, and Tajikistan) via 3b. However, transport operators are inconvenienced to transit through Uzbekistan due to the complicated transit regime.

Border-crossing points and Bottlenecks

In 2016, CPMM made the following observations at key BCPs along corridor 3:

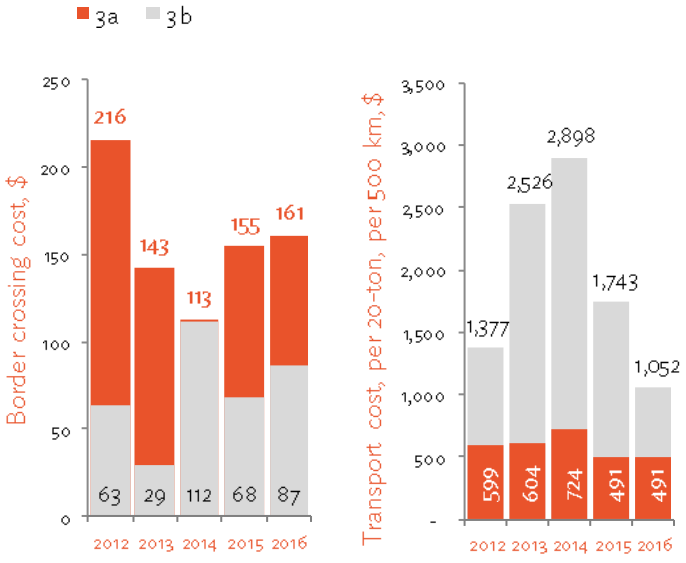
- Yallama–Konysbaeva (Uzbekistan–Kazakhstan): For shipments from Uzbekistan to Kazakhstan, the average border crossing times at Yallama and Konysbaeva are 6.4 hours and 7.6 hours, respectively.
- Aul–Veseloyarsk (Kazakhstan–Russian Federation): Cases of long waiting up to 5 days at the border were reported in Q1 2016, which could be a result of the Kyrgyz Republic's accession to the EAEU (see Box Story 1).
- Karamyk–Karamyk (Kyrgyz Republic–Tajikistan): For shipments from the Kyrgyz Republic to Tajikistan, trucks take 3.7 hours and 2.8 hours at each side of the border. Before the Kyrgyz Republic's accession to the EAEU, Karamyk was used only for bilateral crossing and prohibited against third-party transit traffic. Following its designation as an official border crossing point under the EAEU, the BCP could open up to more transit shipments.

Figure 15: Average Border Crossing Time and Speed Without Delay at Subcorridors 3a and 3b



Source: CPMM estimates

Figure 16: Average Border Crossing and Transport Cost at Subcorridors 3a and 3b



Source: CPMM estimates

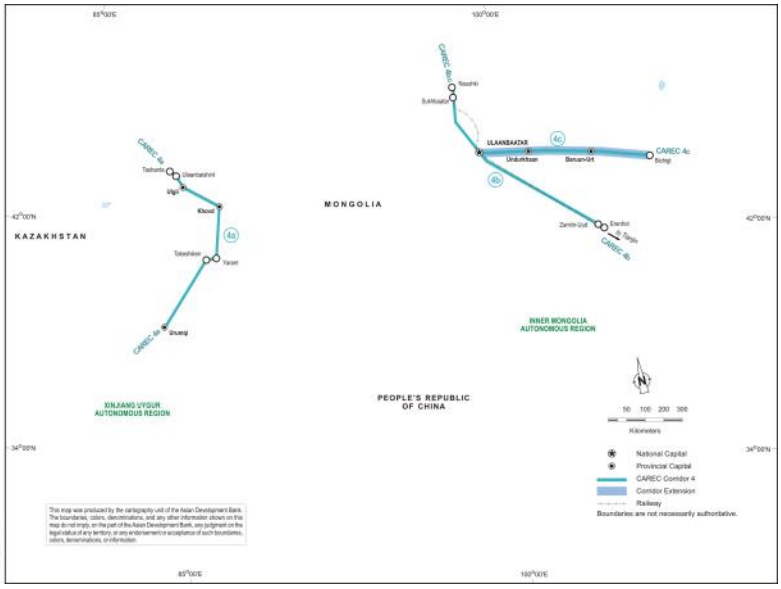
C4 Corridor 4
Russian Federation–East Asia

Corridor 4 connects the Russian Federation, Mongolia, and the PRC and branches out to three subcorridors (Figure 17). Corridor 4a lies in western Mongolia and provides a transit route between the Russian Federation to the PRC. Underdeveloped infrastructure and adverse weather during winter impede efficient road transport along the route. Although the Russian Federation and the PRC have direct borders in that region, the mountainous terrain prevents easy navigation; thus, truck operators prefer to use 4b instead. In 2016, CPMM had the opportunity to receive data on shipments along 4a, which will be discussed further in the following section.

Subcorridor 4b is the most active and covers the key north–south railway of more than 1,000 km, providing an important transit and import–export route to the PRC. The route also caters to road transport, particularly for items prohibited to be carried on trains.

Subcorridor 4c is the route to the east that connects Ulaanbaatar to Chifeng, a major PRC railway node, and Jinzhou, a seaport in the northeastern region of the PRC. The route is designed to alleviate Mongolia's sole reliance on Tianjin, the nearest seaport, for its commercial shipments.

Figure 17: CAREC Corridor 4



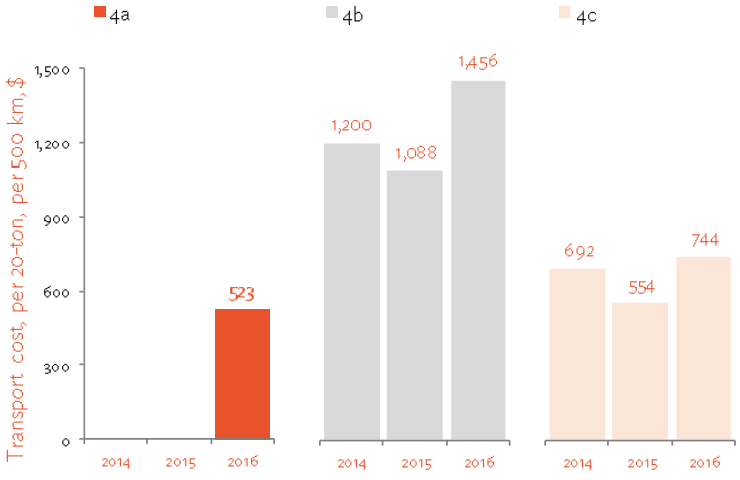
Source: ADB

Road Transport

The PRC exports of raisins, coats, and beverages as well as less than truckload/less than container load (LTL/LCL) are sent on non-containerized trucks from Urumqi to Khovd (975 km) and Bayan (1,055 km) along subcorridor 4a. These two destinations are the population centers in western Mongolia, which are sparsely populated compared with the eastern cities. Shipments could be completed in 2–3 days, and cost $1,700, on average.

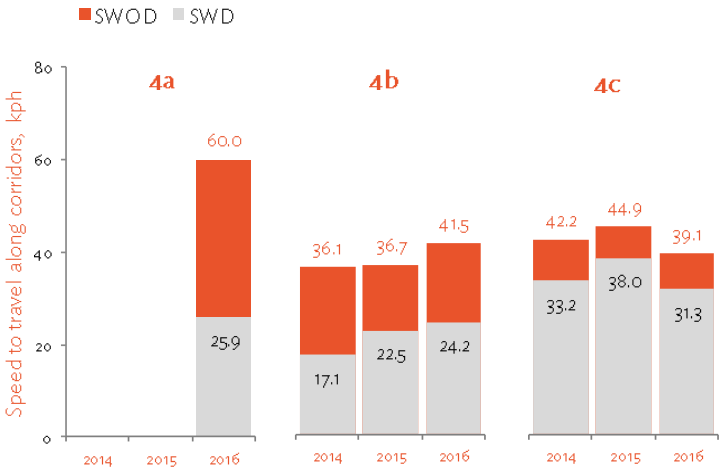
Along subcorridor 4b, covered shipments from Erenhot to Ulaanbaatar (669 km) and to Erdenet (1,205 km) traverse the route. Shipments of diesel, equipment, and consumer items to Ulaanbaatar could be completed in 1 day and cost $1,000. Meanwhile, shipments of equipment, mainly for industrial use, to Erdenet averaged 2.5 days to complete and cost $1,200.

Figure 18: Comparison of Cost along Corridor 4



Note: No data were available for 4a for 2014 and 2015.
Source: CPMM estimates

Figure 19: Comparison of Speed Estimates along Corridor 4



Note: No data were available for 4a for 2014 and 2015.
Source: CPMM estimates

Road traffic along subcorridor 4c consists of shipments of crude oil and minerals (mostly coal) from the PRC to Mongolia via Zuun Khatavch Shipments of diesel oil and small trader cargo are transported to Ulaanbaatar, costing $1,600 and taking about a day to complete. Others are shipped to Erdenet at $400 per truck and take 10 hours. Trucks travel along the corridor at 60 kph along 4c.

The three subcorridors vary widely. In terms of cost and speed, the following observations can be made.

- Corridor 4b is the most costly corridor (Figure 18).
- Trucks also register low speeds along 4b (Figure 19), for both SWOD and SWD metrics, which suggests border crossing time at Erenhot–Zamyn Uud is comparatively longer than other BCPs under corridor 4.

Corridor 4b caters to the highest traffic. Moreover, the BCPs Erenhot–Zamyn Uud are best-equipped to handle all types of border crossing. For instance, only this BCP can accommodate shipments that would require laboratory testing, which is not available at remote BCPs along 4a and 4c. Thus, the potential to divert traffic to either 4a or 4c is limited in the short term. Further development of alternative routes, such as 4c, would prove useful in diversifying trade flows.

Border-crossing points and Bottlenecks

Figure 20 exhibits an improvement in border crossing duration at BCPs along corridor 4 since 2014. Along 4a, PRC transport operators move goods from Urumqi to Takeshiken. Goods are unloaded (3–4 hours) at a customs bonded warehouse after completing formalities, which include paperwork, customs controls, etc. The next day, goods are loaded onto Mongolian trucks to cross Yarant. Border controls are normally completed within 2–3 hours. Mongolia permits PRC trucks to cross Yarant and carry coal in open-top trucks back to Xinjiang Uygur Autonomous Region. This practice ensures two-way haul to mitigate empty returns and to avoid transloading of goods between trucks, thus optimizing transport cost.

Corridor 4b facilitates mainly import shipments into Mongolia. Russian Federation exports enter at Khiagt–Altanbulag (Russian Federation–Mongolia) in the north while PRC shipments enter through Erenhot–Zamyn Uud (PRC–Mongolia) in the south. Although border crossing at Erenhot–Zamyn Uud is considerably lengthier than in other BCPs, the average border crossing time has steadily declined since 2014. Along

Figure 20: Average Border Crossing Time at Corridor 4 BCPs

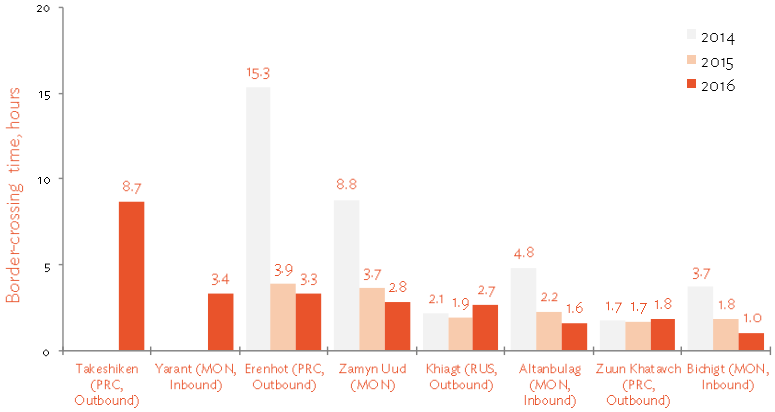
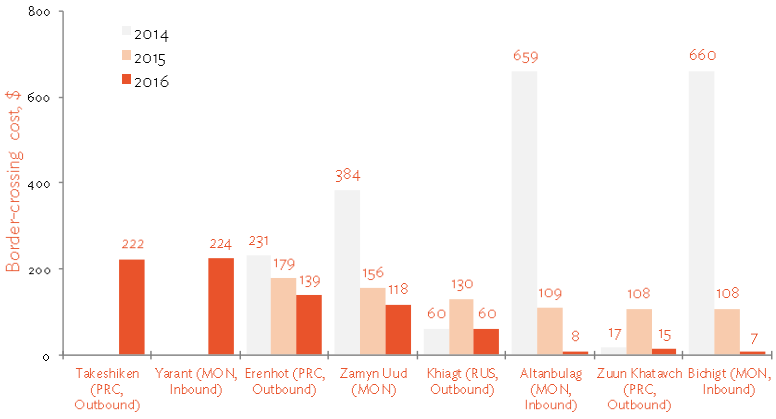


Figure 21: Average Border Crossing Cost at Corridor 4 BCPs



MON = Mongolia, PRC = People's Republic of China, RUS = Russian Federation.
Note: No data were available for Takeshiken and Yarant for 2014 and 2015.
Source: CPMM Estimates

4c, border crossing at Zunn Khatavch–Bichigt is smooth with no major impediments observed.

In terms of cost, border crossing at Takeshiken–Yarant (PRC–Mongolia) is the costliest among BCPs under corridor 4 (Figure 21). At Takeshiken, cost drivers are mainly logistical costs—loading and unloading cost about $142 per truck; storage of goods at temporary facility cost CNY40 (roughly $6.4) per ton per night (an average payload of 30 tons would cost approximately $176); parking fees inside the BCP would cost another $9. Fees for customs controls and others are relatively smaller. Meanwhile, other BCPs show varying signs of improvement.

Rail Transport

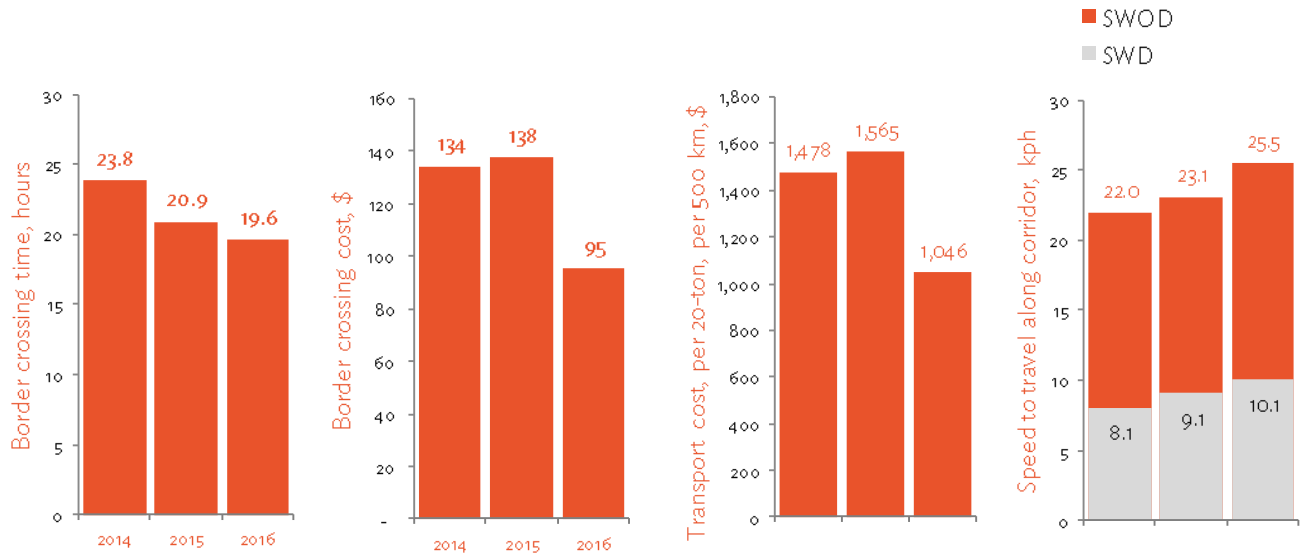
Five types of rail shipments were recorded in 2016.

- **Trains from Tianjin to Ulaanbaatar**
  This route of around 1,692 km is actively used for shipments of containerized goods which takes 10–14 days to complete. The cost of shipping one 40-foot container averages $4,000. Estimated dwell time of containers in Tianjin seaport takes 5 to 7 days.
- **Trains from Ulaanbaatar to Tianjin**
  Mongolia exports cashmere and meat produce to the PRC in this direction.
- **Trains from the Russian Federation to the People's Republic of China**
  Russian Federation timber transits across Mongolia to the PRC. The route covers a distance of 1,113 km which takes 7 days to complete. Shipments cost $1,400, on the average.
- **Trains from Chongqing to Ulaanbaatar**
  Glass bottles are sent along this route, spanning 3,297 km. The whole journey takes 20 days, with trains remaining stationary in terminals 90% of the time. On average, shipment of a 40-foot container costs $5,000.
- **Road–Rail Shipments from Erenhot to Ulaanbaatar**
  Recently added to CPMM samples, shipments of equipment and machinery travel from Erenhot to Ulaanbaatar by a combination of trucks and trains. The route of 764 km takes 3 days to complete, and costs an average of $2,000. Goods are unloaded from trucks at Zamyn Uud and transloaded onto trains.

Figure 22 shows that both SWOD and SWD estimates of trains traveling along 4b gradually increased, inferior nonetheless compared with that of corridor 1. This also proves that rail border crossing time at BCPs along 4b has steadily declined (from 23.8 hours to 19.6 hours).

Cost metrics of rail transport along 4b also showed improvement. Border crossing fees declined from an average of $138 in 2015 to $95. Meanwhile, total transport cost declined to $1,046 from $1,565 the previous year.

Figure 22: Trade Facilitation Indicators of Rail Transport in Corridor 4b



hrs = hours, kph = kilometer per hour, SWD = speed with delay, SWOD = speed without delay.
Source: CPMM Estimates

C5 Corridor 5

Europe–East Asia–Middle East and South Asia

Corridor 5 is a strategically important corridor for trades between Central Asia and South Asia (Figure 23). Despite their proximity, the interregional trade between the two remains low. The World Bank estimates only 0.2% of the overall trade volume flows between the two regions.[7] One possible reason could be the inefficiency in the trade corridors as supported by CPMM data. The corridor has shown the lowest performance in the trade facilitation indicators which implies time-consuming and costly border crossing and high transport cost, relative to other corridors.

Corridor 5 has three subcorridors. All three routes start from the Xinjiang Uygur Autonomous Region, and connects in Urumqi to Kashi, which acts as a transit hub. From here, 5a crosses Irkeshtan–Irkeshtam (PRC–Kyrgyz Republic), Karamyk (Kyrgyz Republic–Tajikistan), Nizhni Pianj–Shirkhan Bandar (Tajikistan–Afghanistan), and Torkham–Peshawar (Afghanistan –Pakistan), and ends at Karachi seaport. The second route 5b links Kashi to Islamabad via the Karakoram Highway and then extends to Karachi. Trucks pass through the mountainous Khunjerab–Sost (PRC–Pakistan). The third route 5c moves along the same route as 5a, but splits at Kabul southward to Kandahar and crosses Spin Buldak–Chaman (Afghanistan–Pakistan) to Gwadar seaport.

Road Transport

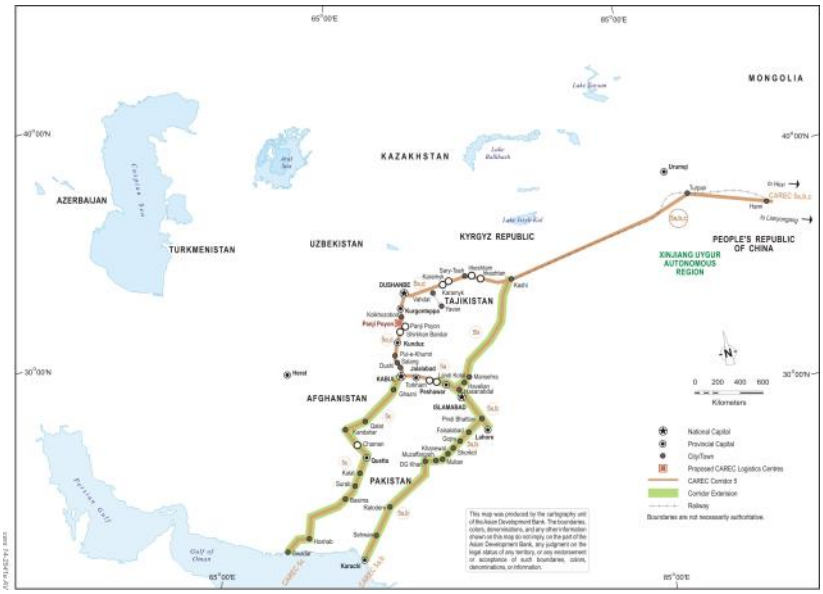
Traffic samples in CPMM show that active movements occurred along the three sections below.

Section 1: Kashi to Dushanbe (PRC to Tajikistan)
Section 2: Kashi to Sost (PRC to Pakistan)
Section 3: Karachi to Kabul (Pakistan to Afghanistan)

Section 1: Kashi to Dushanbe

This is an active corridor connecting East Asia to Central Asia. Goods move either through Karamyk (route A), Batken[8] (route B), or through Kulma Pass (route C). Route A lies along 5a, while routes B and C are not on official CAREC corridors but samples demonstrate these are important alternatives of route A (Table 5).

Figure 23: CAREC Corridor 5



Source: ADB

Table 5: Comparison of Shipping a 40-Foot Container from Kashi to Dushanbe

	Route A	Route B	Route C
Distance, km	869	1,298	1,410
Number of days	3	4	5
Total Cost, $	$5,200	$5,300	$3,500
Total Cost, $ per 500km	$2,992	$2,042	$1,241

km = kilometer.
Source: CPMM Estimates

In principle, route A is the most direct, passing through relatively flat terrain. Karamyk only caters to bilateral traffic operated either by Kyrgyz or Tajik transport operators, and still closed for transit traffic. Thus, Tajik drivers carrying goods from a third-party origin must detour to Dushanbe via route B, which involves longer transport.

7 World Bank. 2016. Presentation on Deepening Trade Relations between Pakistan, Afghanistan, and Central Asia. Singapore. 4 June.
8 The name "Batken" refers to the region at the border. The names of the BCPs are Kyzyl Bel–Guliston (Kyrgyz Republic–Tajikistan). Drivers normally refer to the name "Batken" for border crossing.

Route B requires trucks to move to Batken province and then cross Kyzyl Bel–Guliston (Kyrgyz Republic–Tajikistan). This BCP does not handle high traffic; hence, trucks are not delayed at the border. However, the total cost of transporting goods via routes A and B is relatively the same despite significant difference in distance. Through the CPMM data forms, drivers report that Tajik operators pay significant unofficial fees to transit via Karamyk. Hence, even if taking the Karamyk route is more efficient, regulatory barriers prevent transport operators from carrying transit goods on route A.

Route C is the least costly alternative in terms of vehicle operating cost. The route is used by PRC shippers to send exports to Tajikistan via Karasuu–Kulma Pass. However, the gains in cost are offset by slow delivery time which takes 5 days, longer than that in both routes A and B. The route goes through a mountainous region and difficult-to-navigate roads. Transport speed is reduced due to windy weather and lack of quality-paved roads. Moreover, in winter, the Kulma BCP operates only 3 days a week, with heavy snowfall possibly causing accidents.

In summary, route A (corridor 5a) offers the fastest way, while route C is the least expensive. However, route B is the preferred option particularly in winter which renders route C difficult to navigate.

Section 2: Kashi to Sost

As discussed in earlier reports, the route was open to traffic last October 2015, when the Karakoram Highway was completed. This allows PRC trucks to enter directly into Pakistan territory. Goods shipped at Gwadar pass through Khunjerab BCP at the PRC–Pakistan border along 5b and head to Kashi or Urumqi.

The distance from Kashi to Sost spans 513 km and takes 2 days to complete. The cost of non-containerized shipment is estimated to average $2,400. Even with the completion of the Karakoram Highway, trade facilitation problems persisted.

Initially, to ensure that no goods were illegally removed or added after departure in Kashi, the PRC authorities imposed a mandatory weight inspection at Ta County, about 120 km before the Khunjerab border, which cost shippers $63 per truck. Complaints from shippers and transport operators prompted the removal of this requirement last October 2016. Such issues must be resolved through more effective and stricter controls—mandatory weighing is not the appropriate solution.

A more serious problem was encountered when traffic began to increase. In November 2016, cases of trucks detained at Khunjerab (Pakistan side) for 10 days were reported. Pakistan customs inspected the goods and documents and valued ridiculously high import duties to be paid. The PRC shippers refused the valuation. Only after 10 days of being stalled at the border were disputes settled.

Section 3: Karachi to Kabul

Also a section under corridor 5a, bonded carriers from Pakistan collect containers in Karachi traveling a distance of 1,654 km to Kabul. Long dwell time at the Karachi port and lengthy border crossing delays at Peshawar–Torkham (Pakistan–Afghanistan) partly explain the inferior trade facilitation indicator estimates for corridor 5.

The cost of shipping 40-foot containers averages $2,640. However, substantial border crossing fees (including unofficial fees) of another $1,000 on top of the shipping cost results in high normalized transport cost per 500 km, pulling the overall average for the region.

Border-crossing points and bottlenecks

The major bottlenecks in corridor 5 are as follows:

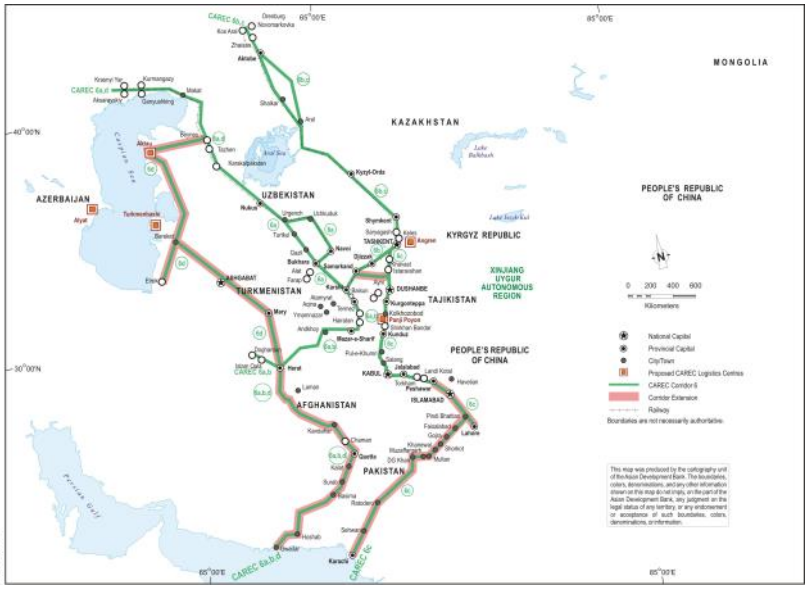
- Peshawar–Torkham (Pakistan–Afghanistan): For shipments from Pakistan to Afghanistan, drivers spend 1 day to complete customs controls at Peshawar, and 12 hours waiting in queue. At the other side of the border, trucks spend even longer—waiting could take half a day, and customs formalities could be completed in 2 days.
- Irkeshtan–Irkeshtam (PRC–Kyrgyz Republic): Border crossing time at the PRC side of Irkeshtan spiked to 17 hours, while at Irkeshtam averaged 5 hours. On average, 50 trucks cross the BCP per day, which doubles during peak season. Cargoes flow from the PRC to the Kyrgyz Republic. In the other direction, trucks returned empty (see Box Story 2 for more information).
- Karamyk–Karamyk (Kyrgyz Republic–Tajikistan): Border crossing time is short, taking only 2–3 hours in 2016. Karamyk is also designated as an international border point in the Eurasian Economic Union.
- Kyzyl Bel–Guliston (Kyrgyz Republic–Tajikistan): Border crossing is relatively fast in the BCP pair due to low traffic. Trucks could go through in 1–2 hours. On average, the BCP processes only 2 to 3 cargo vehicles per day.

C6 Corridor 6

Europe–Middle East and South Asia

In Corridor 6, Central Asia serves as a transit route connecting Europe with the Middle East and South Asia (Figure 24). There are four subcorridors. Corridor 6a connects Gwadar seaport to the Russian Federation, through Uzbekistan and Kazakhstan in the Caspian region. Corridor 6b is similar except that the route passes through the Aktobe region. Corridor 6c links Karachi seaport to Afghanistan, Tajikistan, Uzbekistan, and Kazakhstan to the Russian Federation. Corridor 6d is an extension of 6a/6b but links Gwadar seaport to Afghanistan and Turkmenistan, including at sea terminals at Turkmenbashi and Aktau. This corridor has many roads and railways running parallel to each other; hence, a potentially good multimodal corridor if inland waterways transport is well integrated to land.

Figure 24: CAREC Corridor 6



Source: ADB

Road Transport

Border crossing times among the four subcorridors vary widely. The average border crossing time at BCPs along 6a and 6b were minimal, relative to 6c. New samples of traffic along 6d reveal time-consuming delays at the borders.

Routes 6a and 6b are popular with Uzbek operators, who use them extensively for cross-border cargo movement between the Russian Federation and Kazakhstan. Trucks cross Yallama–Konysbaeva (Uzbekistan–Kazakhstan), Alat–Farap (Uzbekistan –Turkmenistan), and Dautota–Tazhen (Uzbekistan–Kazakhstan), spending an average border crossing time of 6–7 hours at each border (Figure 25).

In 2016, border crossing along 6c proved to be time-consuming. Pakistan ships fresh fruits to Uzbekistan. Trucks cross Peshawar–Torkham (Pakistan–Afghanistan) where customs controls and loading/unloading take 1–2 days at the Pakistan side of the border. Trucks then enter Afghanistan and travel under the "C2" international transit system. Border crossing at Torkham is relatively short as perishables typically are classified as "green channel." Trucks then head to Hairatan where goods are transferred onto barges. The vessels carry the goods across Amu Darya River to Termez. After completing documentation and controls, goods are transferred onto trains and head to Tashkent. Significant delays were observed at Hairatan–Termez (Afghanistan–Uzbekistan). The need to cross a river added a 1-day waiting time for barges. Loading and unloading requires another 5–6 hours at each BCP.

CPMM data show that the entire journey takes about 16 days. The distance of 1,792 km from Peshawar to Tashkent could be completed in 3–4 days (assuming a coverage of 500 km per day). Long lead times at (i) the river crossing taking 5–6 days, at times, due to unreliable barge service, and (ii) slow speeds of the train from Termez to Tashkent taking 3–4 days, contribute to the inefficiency of transport along the route. Slow transport by trains is a concern particularly in summer when the weather is hot, affecting food quality.

As indicated in Figure 25, border crossing time at BCPs along 6d is lengthy. CPMM samples of fresh fruits collected and consolidated at Quetta, Pakistan, are carried by trucks and cross Chaman–Spin Buldak (Pakistan–Afghanistan). An average of 2 days for customs controls, after spending 1–2 days in parking lots waiting for their turn contributed to the lengthy process of border crossing procedures at the border. Trucks take 1–2 days to complete formalities at Torkham and move to

Figure 25: Comparison of Border Crossing Times in Corridor 6

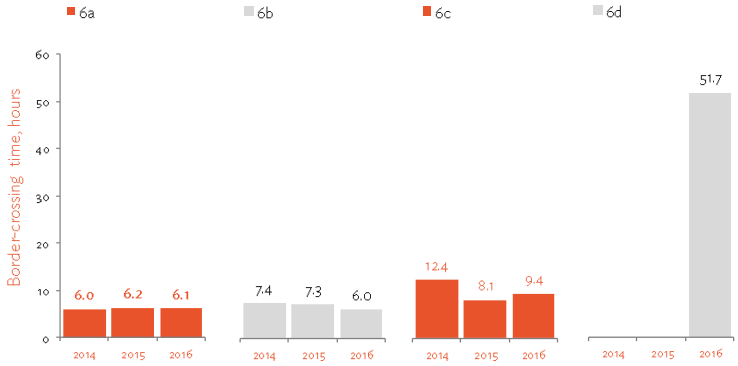
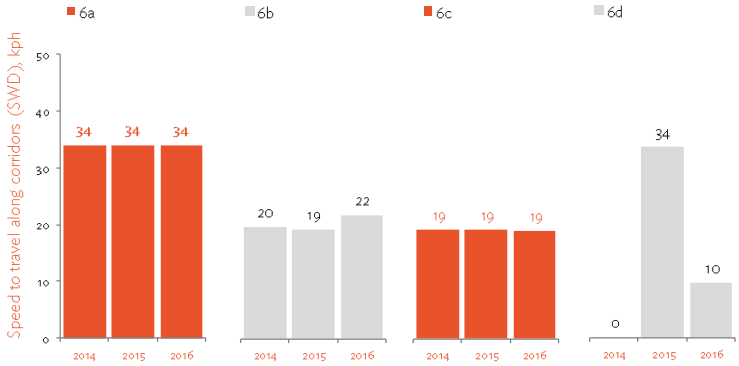


Figure 26: Comparison of Speed Estimates in Corridor 6



kph = kilometer per hour; km = kilometer
Note: Data on Corridor 6d were limited for 2014 and 2015.
Source: CPMM Estimates

Figure 27: Comparison of Border Crossing Costs in Corridor 6

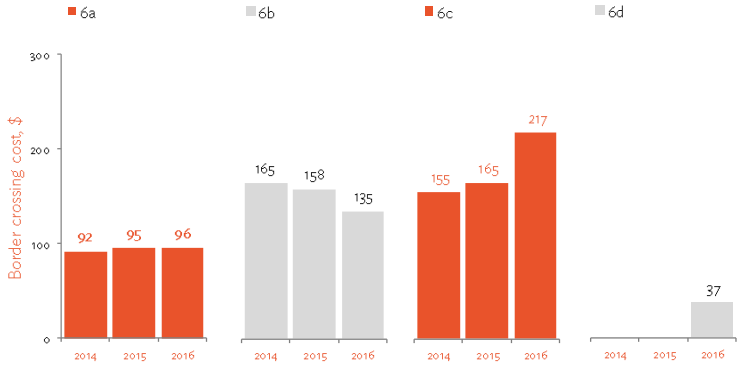
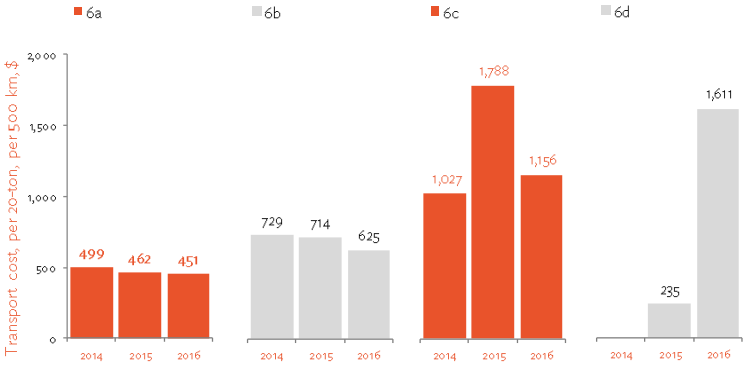


Figure 28: Comparison of Transport Costs in Corridor 6



Towraghondi, a BCP at the Afghanistan–Turkmenistan border. Goods spend about 1–2 days waiting and are loaded onto trains to cross Serkhet Abad, a BCP at the Turkmenistan side. The transloading process is time-consuming at this BCP due to Afghanistan's relatively short experience in railway operations. Capacity building for the Afghanistan Railways Authority as well as more material handling equipment at Towraghondi could increase border management efficiency and consequently shorten border crossing time.

Figure 26 reveals that SWD estimates in 6a are significantly higher, suggesting better transport infrastructure in Uzbekistan, as well as the comparatively shorter border crossing time at the Uzbek BCPs. Meanwhile, long border crossing time in 6d resulted in slow SWD average. As expected, SWD is inversely related to border crossing time.

Figure 27 shows border crossing cost of the four subcorridors. Corridor 6a exhibited a stable trend, while 6b showed declining costs, and 6c experienced an increase.

Border crossing at Peshawar–Torkham (Pakistan–Afghanistan) contributed to the increase in border crossing cost in corridor 6c. New transport operators provided more details on cost drivers that were previously not reported, mostly customs-related fees at both BCPs. Also, data on unofficial fees were collected in 2016. Between the two BCPs, a series of police checkpoints solicited bribes from drivers. In addition, drivers also paid sums to border security, customs, and weight inspection.

Shipments along 6d cross two BCPs: Chaman–Spin Buldak (Pakistan–Afghanistan) and Towraghondi–Serkhet Abad (Afghanistan–Turkmenistan), a rail BCP. No major cost drivers were observed at Chaman–Spin Buldak, although unofficial costs were recorded for border security, customs,

Box 3: Recent Innovations and Developments to Combat Fraudulent Practices

In CPMM, there are two main viewpoints on weight inspection. The private sector complains about excessive weighing for carrying goods bound for an overseas destination. Transport operators claim that shipments are weighed every time a vehicle enters a new country to obtain a valid weight certificate. From the private operator's perspective, this exercise is a waste of time and money. On the other hand, authorities are rightfully concerned about smuggling, as well as overladen vehicles. Weight limits set by national law are often violated, which also results in rapid deterioration of the road surface.

From a trade facilitation perspective, risk-based management and greater adoption of information and communication technology is a more appropriate solution than imposing onerous burdens on the private sector. The following are some recent efforts in the CAREC region.

- Kazakhstan started implementing the Automated System for Customs Data (ASYCUDA) in July 2016. This creates a common database linking all data within the country, including remote border crossing points (BCPs). In addition, the country pioneered the use of "smart packets" that ensure shipping documents are sealed and not tampered with during the transit journey.
- The Association of the International Road Transport Operators of the Kyrgyz Republic (AIRTO-KR) is the national transport association in the Kyrgyz Republic. It also serves as the Transports Internationaux Routiers (or International Road Transport) (TIR) guarantee and issuing authority. The association requires all international carriers using TIR to use the "smart seal" so that vehicles can be tracked and traced throughout the journey. Investments to develop an information technology system that integrates a global positioning system and a geographic information system will enable the monitoring of routes and the location of any vehicle carrying transit in the region.
- Customs authorities of Afghanistan, Pakistan, and Tajikistan are discussing electronic data interchange to shorten time spent for post clearance audit and verification of transit completion. Currently, each country uses different information systems. Afghanistan has installed ASYCUDA World, while Pakistan uses an in-house system called Web One for Customs (WEBOC) and Tajikistan uses a proprietary soluton called Unified Automated Information System (UAIS). This limits the use of automated online exchange of data. Checks are time-consuming and problems are detected manually only after the truck has crossed the border.

In this aspect, Kazakhstan and the Kyrgyz Republic are moving ahead to institute electronic pre-declaration. For instance, the Kyrgyz Republic has ratified a law that requires shippers to send cargo manifest details to a portal at least 2 hours before trucks arrive at the BCP. This allows processing of documentation within 30 minutes and may not require trucks to undergo full inspection and examination. The two countries, as well as Mongolia, are also discussing with the International Road Transport Union to implement TIR-EPD (electronic pre-declaration).

Source: CPMM Consultant's research

immigration, and transport inspections.

Overall transport costs in 6a, primarily reported by Uzbek transport operators, remained stable (Figure 28). The costs fluctuated more substantially for 6b and 6c, as reported by operators in Afghanistan, the Kyrgyz Republic, and Tajikistan. As mentioned in earlier reports, business demand for tranport services are negatively affected by the International Security Assistance Force (ISAF) withdrawal. Hence, price competition resulted in downward pressure on trucking rates.

Border-crossing points and bottlenecks

The major bottlenecks in corridor 6 occurred at the following BCPs:

- Shirkhan Bandar–Nizhni Pianj (Afghanistan–Tajikistan): PRC exports enter Afghanistan through this BCP. Traffic is possible due to the "Friendship" Bridge constructed by US engineers. Transloading of goods take place at Shirkhan Bandar. For goods entering Afghanistan, the waiting time averaged 2–3 hours at each border, on top of 3–4 hours

completing standard border crossing procedures. For exports at transit shipments from Afghanistan into Tajikistan, waiting time at Shirkhan Bandar averaged 60 hours due to the heightened perceived risk related to shipments from Afghanistan. Tajik authorities have to thoroughly inspect incoming vehicles. Hence, trucks are held up in Shirkhan Bandar, waiting in parking lots until Nizhni Pianj opens its gate for trucks to enter.

- Hairatan–Termez (Afghanistan–Uzbekistan): This is another BCP pair where border crossing is cumbersome. Goods must use barges to cross the Amu Darya River and reach the opposite BCP. Barges are operated by an Uzbek company, but anecdotal feedback from Afghan shippers indicates that this service is time-consuming and unreliable. The long waiting time detected at Hairatan supports this observation.

Rail Transport

In 2016, rail data samples for Corridor 6 were observed for the first time.

Along 6b, goods travel a distance of 900 km from Termez to Tashkent on trains. The shipment costs $900, on average, for a 20-foot container. The cargo reaches Tashkent in 3 to 4 days where it takes another 9 hours to unload cargo.

Along 6d, goods are sent on trucks to Towraghondi (Afghanistan), and then loaded onto trains. Trains pass through Serkhet Abad (Turkmenistan) and continue to Ashgabat, 700 km away, taking 24 hours to complete. The transport cost averages $1,180 for a 20-foot container. At Ashgabat, another 20 hours is spent to unload cargo.

Border-crossing points and bottlenecks

Major bottlenecks in corridor 6 are as follows:

- Towraghondi–Serkhet Abad (Afghanistan–Turkmenistan): Waiting for material transfer from trucks to temporary storage and then to trains contributed to the delay at Towraghondi, which could take 1–2 days. The terminal still relies on equipment and technology deployed during Soviet times. Lack of funds has hampered the processing capacity of the railway terminal. At Serkhet Abad, the lead time is shorter—customs formalities take 3 hours and waiting in the terminal lasts no more than 4 hours.

V. Summary and Conclusion

In 2016, CPMM collected 2,756 samples from seven countries in six CAREC corridors, using actual commercial shipments via by road, rail, or multimodal transport. Road transport reported shorter time and lower cost at BCPs than those at railway. However, railway had the advantage of lower total transport cost.

In general, the trade facilitation indicators showed some improvements. However, other areas experienced inefficiencies. More time was spent crossing borders by road transport, mainly due to customs clearance, waiting in queue, and escort/convoy. Lesser time was spent at the border for rail transport compared with 2015, but availability of wagons is an issue.

In 2016, more money was spent to complete a border crossing by both road and rail transports, but the increase was relatively insignificant. For road transport, payments and fees for escort/convoy, customs clearance, and loading/unloading were costly. For rail transport, costly activities are related to material handling such as loading and unloading of cargoes, as well as gauge-change operations. CPMM also observed records of unofficial payments, with this rent-seeking behavior particularly prevalent in customs clearance, weight/standard inspection, and health/quarantine activities. The decline in total transport costs for both modes gives a positive outlook for the transport industry. Estimates for corridors 3, 4, and 6 reported impressive improvements.

Corridor analysis shows that corridor 5 continues to be the least favorable section in terms of time and cost, despite exhibiting improvement compared with the previous year. Evidence shows that the average speed of trucks traveling along corridor 5 has increased gradually over time. Major problems persist, especially in cross-border cargo movements between Afghanistan, Pakistan, and Tajikistan.

CPMM is on its eighth year of measurement and monitoring CAREC corridors. Looking ahead, the following new initiatives are anticipated to broaden and deepen the application of CPMM:

- **Addition of Georgia into CPMM**. An agreement with the Georgia International Road Carriers Association (GIRCA) was initiated in March 2017. Samples from GIRCA focus on shipments between Georgia, Azerbaijan, and Kazakhstan. New data are expected to reveal new insights on cargo movement along the Caspian Sea and the Caucasus and thus deepen the understanding of transport and trade flow along corridors 2 and 6, which could be extended into Georgian territory.

- Refining CPMM to cater to **multimodal shipments**. Although CPMM methodology has been refined over the years, initial designs focused on road transport. In 2014, the methodology was further developed to collect data on border crossing delays in rail transport. An integrated multimodal methodology may open opportunities to enhance CPMM's understanding of the traffic flow in the region.

- Efforts are also made to complement CPMM with **time release studies** (TRS), a tool developed by the World Customs Organization to appraise the performance of customs and border agencies from the time of arrival of vehicles at the border until release. While CPMM focuses on "at the border" problems and data are collected by drivers and freight forwarders, TRS covers "behind the border" issues as well, and data are collected by customs officers, customs brokers, and other border agencies. CPMM highlights the inefficient and suboptimal BCPs to the TRS team who in turn uses the data as reference to identify bottlenecks along the corridor.

Appendixes

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 2016, the 11 CPMM partners working closely with CAREC include the following:

	Country	Association	
1	AFG	Association of Afghanistan Freight Forwarding Companies	AAFFCO
2	KGZ	Association of the International Road Transport Operators of the Kyrgyz Republic	AIRTO
3	MON	Mongolia Chamber of Commerce and Industry	MNCCI
4	MON	National Road Transport Association of Mongolia	NARTAM
5	PAK	Pakistan International Freight Forwarders Association	PIFFA
6	PRC	Chongqing International Freight Forwarders Association	CQIFA
7	PRC	Inner Mongolia Autonomous Region Logistics Association	IMARLA
8	PRC	Xinjiang Uygur Autonomous Region Logistics Association	XUARLA
9	TAJ	Association of International Automobile Carriers of Tajikistan	ABBAT
10	TAJ	Association of International Automobile Transport of Tajikistan	AIATT
11	UZB	Business Logistics Development Association	ADBL

Appendix 2:
CPMM Methodology

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

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 drivers' 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 CAREC countries to standardize the implementation. They also analyze the aggregated data and draft the quarterly and annual reports.

ADB Trade Facilitation Team

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. The team assists in the report preparation.

Sampling Methodology and Estimation Procedures

Each month, coordinators of each CPMM partner randomly select drivers to 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 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.

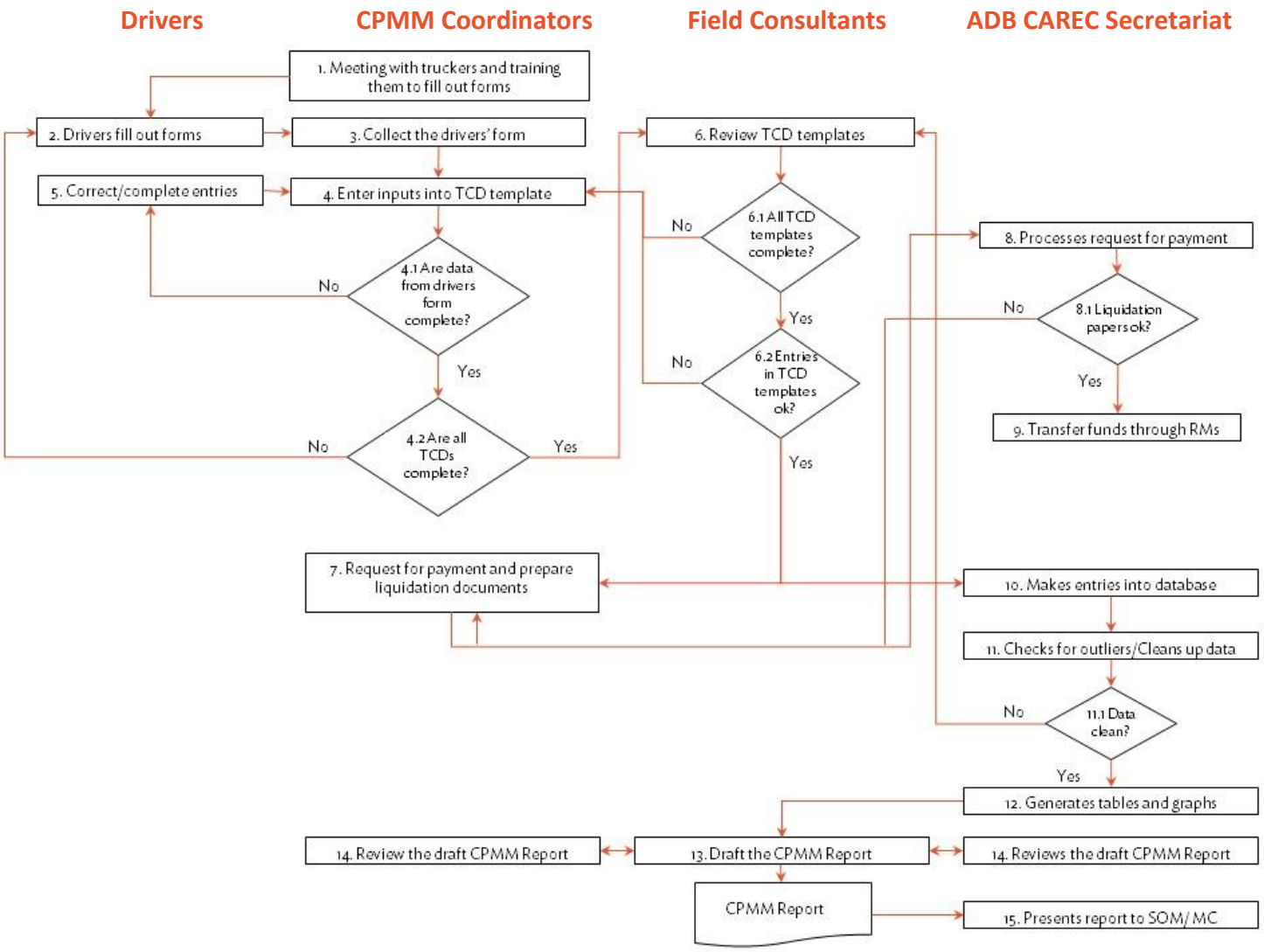
Normalization is done in terms of a 20-ton truck in the case of road transport or in terms of a twenty-foot equivalent unit (TEU) in the case of rail traveling 500 kilometers (km). The number of border crossing points (BCPs) for sub-corridors is also normalized for each 500 km segment.

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 are 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 are 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 and 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 for the data overall, based on normalized TCD samples.

Appendix 3:
Overview of CPMM Methodology



Appendix 4:
CAREC Border Crossing Points

	Corridor	BCP 1		BCP 2	
1	1a, 2c	PRC	Alashankou	KAZ	Dostyk
2	1a, 1c	KAZ	Kairak	RUS	Troitsk
3	1b	PRC	Khorgos	KAZ	Korgas
4	1b, 6b, 6c	KAZ	Zhaisan	RUS	Kos Aral / Novomarkovka (Sagarchin)
5	1c	PRC	Torugart / Topa	KGZ	Torugart
6	1c, 3b	KAZ	Merke	KGZ	Chaldovar
7	2a, 2b, 2d, 5a, 5c	PRC	Yierkeshitan	KGZ	Irkeshtam
8	2a, 2b	KGZ	Kara-Suu (Dostuk)	UZB	Kara-Suu / Savay (Dustlik)
9	2a, 2b	TAJ	Kanibadam	UZB	Kokland
10	2a, 2b	TAJ	Nau	UZB	Bekabad
11	2a, 6a	KAZ	Beyneu (rail) / Tazhen (road)	UZB	Karakalpakstan (Daut-Ata)
12	2a, 2c	AZE	Baku	KAZ	Aktau
13	2a, 2b, 2c	AZE	Red Bridge (road) - Beyuk Kesik (rail)	GEO	Red Bridge (road) - Gabdabani (rail)
14	2b, 3a	UZB	Alat	TKM	Farap
15	2b	AZE	Baku	TKM	Turkmenbashi
16	2d, 3b, 5a, 5c	KGZ	Karamyk	TAJ	Karamyk
17	2d, 5a, 5c, 6c	AFG	Shirkhan Bandar	TAJ	Panji Poyon / Nizhni Pianj
18	3a, 3b	KAZ	Aul	RUS	Veseloyarsk
19	3a, 6b, 6c	KAZ	Zhibek Zholy - Saryagash/Yallama	UZB	Gisht Kuprik - Keles
20	3a	TKM	Sarahs	IRN	Sarakhs
21	3b	TAJ	Pakhtaabad	UZB	Saryasia
22	3a, 6a, 6b	AFG	Hairatan	UZB	Termez /Airatom
23	3b, 6b, 6d	AFG	Islam Qala	IRN	Dogharoun
24	4a	MON	Ulaanbaishint / Tsagaanur	RUS	Tashanta
25	4a	PRC	Takeshikent	MON	Yarant
26	4b, 4c	MON	Sukhbaatar	RUS	Naushki
27	4b	PRC	Erenhot	MON	Zamiin-Uud
28	6a, 6d	KAZ	Kurmangazy (road) / Ganyushking (rail)	RUS	Krasnyi Yar (road) / Aksaraskaya (rail)
29	6c	TAJ	Istaravshan	UZB	Khavast
30	6d	KAZ	Bolashak	TKM	Serkhetyaka
31	2d	AFG	Aqina	TKM	Imam Nazar
32	2d, 6d	AFG	Torghondi	TKM	Serkhet Abad
33	5b	PRC	Khunjerab	PAK	Sost
34	5c, 6a, 6b, 6d	AFG	Chaman	PAK	Spin Buldak
35	5a, 6c	AFG	Torkham	PAK	Peshawar
36	4c	PRC	Zuun Khatavch	MON	Bichigt

Appendix 5:
Trade Facilitation Indicators

		Overall						Road						Rail					
		2015			2016			2015			2016			2015			2016		
	Corridor	Mean	Median	Margin	Mean	Median	Margin	Mean	Median	Margin	Mean	Median	Margin	Mean	Median	Margin	Mean	Median	Margin
TFI1	Time taken to clear a border crossing point, hr																		
	Overall	13.1	5.6	± 0.5	14.6	5.7	± 0.5	9.3	4.7	± 0.4	11.3	4.7	± 0.5	27.4	23.0	± 1.3	25.9	20.5	± 1.2
	1	18.0	5.0	± 1.1	21.5	14.5	± 1.2	1.8	0.4	± 0.2	1.8	0.4	± 0.2	32.2	32.5	± 1.4	31.0	34.5	± 1.4
	2	6.3	5.9	± 0.3	6.2	6.0	± 0.1	6.3	5.9	± 0.3	6.2	6.0	± 0.1	–	–	–	–	–	–
	3	5.3	5.4	± 1.3	4.6	3.4	± 0.9	5.3	5.4	± 1.3	4.6	3.4	± 0.9	–	–	–	–	–	–
	4	8.4	3.4	± 0.8	8.0	2.7	± 0.8	2.8	2.1	± 0.1	2.4	2.1	± 0.1	20.9	12.0	± 2.4	19.6	12.0	± 2.1
	5	26.2	28.0	± 1.3	28.4	28.0	± 1.3	26.2	28.0	± 1.3	28.4	28.0	± 1.3	–	–	–	–	–	–
	6	7.4	6.4	± 0.4	10.6	6.5	± 0.7	7.4	6.4	± 0.4	10.2	6.5	± 0.7	–	–	–	18.8	28.8	± 2.7
TFI2	Cost incurred at border crossing clearance, $																		
	Overall	161	129	± 3	171	145	± 4	149	125	± 3	160	144	± 4	208	140	± 9	215	150	± 11
	1	175	84	± 9	217	130	± 12	99	33	± 13	125	22	± 20	241	300	± 10	264	300	± 13
	2	173	87	± 16	173	87	± 15	173	87	± 16	173	87	± 15	–	–	–	–	–	–
	3	89	81	± 9	99	81	± 6	89	81	± 9	99	81	± 6	–	–	–	–	–	–
	4	148	161	± 5	103	90	± 4	151	171	± 4	104	92	± 4	138	125	± 16	95	44	± 12
	5	184	175	± 6	236	231	± 8	184	175	± 6	236	231	± 8	–	–	–	–	–	–
	6	145	115	± 6	169	135	± 7	145	115	± 6	168	135	± 7	–	–	–	178	295	± 30
TFI3	Cost incurred to travel a corridor section, $ per 500km, per 20-ton cargo																		
	Overall	1,323	876	± 37	1,125	906	± 26	1,341	893	± 42	1,174	981	± 31	1,250	823	± 79	966	767	± 50
	1	1,083	900	± 44	900	778	± 40	1,069	997	± 53	981	919	± 67	1,097	790	± 70	853	559	± 50
	2	522	482	± 17	521	474	± 18	522	482	± 17	521	474	± 18	–	–	–	–	–	–
	3	1,559	899	± 141	951	664	± 69	1,559	899	± 141	951	664	± 69	–	–	–	–	–	–
	4	1,217	811	± 87	1,197	876	± 66	992	768	± 65	1,302	927	± 82	1,565	1,117	± 188	1,046	843	± 108
	5	2,008	1,938	± 92	1,835	1,621	± 62	2,008	1,938	± 92	1,835	1,621	± 62	–	–	–	–	–	–
	6	1,276	662	± 95	978	815	± 46	1,276	662	± 95	931	785	± 46	–	–	–	1,627	1,904	± 157
TFI4	Speed to travel on CAREC Corridors, kph																		
	Overall	21.1	19.7	± 1.6	20.1	17.7	± 1.6	23.2	22.7	± 1.7	22.3	22.4	± 1.7	14.0	9.1	± 3.5	14.3	9.5	± 3.4
	1	22.5	23.4	± 3.6	22.6	22.2	± 4.4	29.5	28.1	± 4.0	31.7	28.0	± 5.3	16.9	9.3	± 4.8	17.8	9.5	± 5.2
	2	23.4	22.0	± 3.5	23.8	22.2	± 3.7	23.4	22.0	± 3.5	23.8	22.2	± 3.7	–	–	–	–	–	–
	3	28.3	27.7	± 4.9	26.7	27.6	± 4.3	28.3	27.7	± 4.9	26.7	27.6	± 4.3	–	–	–	–	–	–
	4	20.2	20.7	± 4.6	17.9	15.4	± 3.3	25.8	25.5	± 4.9	25.7	25.7	± 2.8	9.1	8.6	± 1.8	10.1	9.7	± 2.2
	5	13.1	13.1	± 1.1	11.6	12.0	± 1.4	13.1	13.1	± 1.1	11.6	12.0	± 1.4	–	–	–	–	–	–
	6	23.2	24.8	± 3.2	21.8	22.7	± 3.1	23.2	24.8	± 3.2	22.5	23.7	± 3.1	–	–	–	8.3	9.3	± 2.8
SWOD	Speed Without Delay																		
	Overall	39.8	41.0	± 1.8	40.9	44.8	± 2.2	40.2	40.4	± 1.8	41.7	44.2	± 2.4	38.3	45.0	± 5.0	38.6	45.1	± 5.0
	1	46.2	48.6	± 2.1	49.9	49.6	± 2.3	44.6	48.4	± 3.5	50.2	51.2	± 3.4	47.5	48.9	± 2.1	49.8	48.0	± 3.1
	2	49.2	49.6	± 2.4	48.9	49.4	± 2.1	49.2	49.6	± 2.4	48.9	49.4	± 2.1	–	–	–	–	–	
	3	40.3	39.5	± 5.4	40.3	40.7	± 4.6	40.3	39.5	± 5.4	40.3	40.7	± 4.6	–	–	–	–	–	
	4	33.2	38.1	± 4.8	33.8	34.0	± 7.1	38.4	40.3	± 4.1	42.1	41.1	± 10.6	23.1	22.1	± 6.5	25.5	24.8	± 6.1
	5	36.4	31.1	± 4.1	38.4	31.1	± 4.8	36.4	31.1	± 4.1	38.4	31.1	± 4.8	–	–	–	–	–	
	6	38.9	38.4	± 4.0	37.9	38.4	± 3.6	38.9	38.4	± 4.0	39.1	38.5	± 3.4	–	–	–	15.3	12.3	± 8.7

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

Appendix 6:
Cost Structure of TFI3

		Overall						Road						Rail					
			2015			2016			2015			2016			2015			2016	
	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	1,323	704	619	1,125	590	535	1,341	702	639	1,174	585	589	1,250	715	535	966	607	359
	1	1,083	745	339	900	482	418	1,069	819	250	981	572	410	1,097	626	471	853	440	412
	2	522	380	141	521	379	141	522	380	141	521	379	141	-	-	-	-	-	-
	3	1,559	867	693	951	568	382	1,559	867	693	951	568	382	-	-	-	-	-	-
	4	1,217	703	514	1,197	773	424	992	668	324	1,302	771	531	1,565	993	572	1,046	778	268
	5	2,008	1,597	411	1,835	1,092	743	2,008	1,597	411	1,835	1,092	743	-	-	-	-	-	-
	6	1,276	440	836	978	456	522	1,276	440	836	931	443	489	-	-	-	1,627	1,540	86
%	Percent to Total																		
	Overall		53%	47%		52%	48%		52%	48%		50%	50%		57%	43%		63%	37%
	1		69%	31%		54%	46%		77%	23%		58%	42%		57%	43%		52%	48%
	2		73%	27%		73%	27%		73%	27%		73%	27%						
	3		56%	44%		60%	40%		56%	44%		60%	40%						
	4		58%	42%		65%	35%		67%	33%		59%	41%		63%	37%		74%	26%
	5		80%	20%		60%	40%		80%	20%		60%	40%						
	6		35%	65%		47%	53%		35%	65%		48%	52%					95%	5%

Appendix 8:
Activities at Road BCPs, Outbound

				Duration (hrs)																	Cost (US$)																
				Total		Activities															Total		Activities																
BCP	Country	Corridor	Count	Average	Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Average	Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Chaman	PAK	5,6	50	59.5	74.4	0.8	35.6				0.6				0.3						22.7	125	41	10	106				7				10						
Shirkhan Bandar	AFG	2,5,6	98	39.7	60.0	0.9	0.8				0.6		0.3						1.1	0.5	60.7	141	151	15	26				100		8					96	20	
Peshawar	PAK	5,6	467	34.7	28.7		27.0					0.3							4.1	0.7	12.3	303	282		278					6						50	8	
Petuchovo	RUS	1,6	9	21.4	0.1	0.1															96.0																	
Irkeshtan	PRC	2,5	157	18.8	22.2	0.4	0.5	0.3	0.3	0.3	0.3				0.5	0.4				0.3	16.2	198	245	11	11	2	2	2	55				92	2				55	
Veseloyarsk	RUS	3	17	15.7	0.1	0.1									0.2						132.0																	
Takeshiken	PRC	4	15	8.7	7.8	0.2	2.3	1.2											3.5		1.4	222	225		44	30										139		9
Sarahs	TKM	3	1	7.8	7.8	0.7	1.2	0.6					0.2		0.7	0.4					4.2	76	76	15	17	12					6		14	12					
Tazhen	KAZ	2,6	59	7.3	7.2	0.9	1.2	0.3	0.4				0.2	0.5	0.5	0.4					3.6	123	120	28	44	14	10				4	17	15	12					
Khorgos	PRC	1	48	7.0	6.9	0.2	1.7	0.8			0.2				0.5				3.5		0.3	599	599		137	126							11			321		4
Dautota	UZB	2,6	90	6.9	6.8	0.7	1.2	0.4	0.6	0.7		0.3	0.3		0.5						3.7																	
Yallama	UZB	3,6	85	6.4	6.1	0.7	1.2	0.5	0.5			0.3	0.3	0.3	0.5		1.3				3.2																	
Alat	UZB	2,3	57	6.2	6.3	0.7	1.2	0.5	0.5	0.3			0.3		0.6	0.5					3.3																	
Farap	TKM	2,3	71	5.8	5.8	0.8	1.1	0.3	0.4				0.3	0.4	0.5	0.4					2.9	55	53	9	19	10	10				5	15	14	9					
Merke	KAZ	1,3	10	4.9	4.2	0.6	1.2		0.5					0.3	0.5	0.2					3.3	76	78	27	34		21					10	25	15					
Oibek	UZB	2,3,6	21	4.7	3.4	0.4	1.6	0.2	0.4	0.3	0.2		0.3	0.3	0.6						3.2	81	81	15	25	8	5	10	5			8		5					
Sarasiya	UZB	3	93	4.5	3.4	0.4	1.6	0.2	0.4	0.3	0.2		0.3	0.3	0.5						2.8	94	81	15	38	8	5	10	5			8		5					
Karamik	KGZ	2,3,5	62	3.7	4.4	0.4	0.4	0.4	0.3	0.3	0.3			0.3	0.4	0.3					2.4	75	95	11	23	7	7	8	3			3	25	4					
Kurmangazy	KAZ	6	46	3.6	3.9	0.7							0.3	0.3							2.6	42	45	27							11	17						
Taskala	KAZ	6	20	3.6	3.7	0.7								0.4							2.6	42	40	32								15						
Nizhni Pianj	TAJ	2,5,6	219	3.6	2.3	0.3	0.4	0.2	0.2	0.2	0.2	0.1		0.2	0.5	0.3			0.5		2.9	131	36	10	22	8	8	8	5	2		3	47	3	108				
Erenhot	PRC	4	360	3.3	2.8	0.3	1.8	0.5	0.3		0.0	0.3			0.3	0.3			0.3		0.4	139	168	14	106	13							23	1					
Khiyagt	RUS	4	60	2.7	2.2	0.3	0.9	0.3	0.3			0.3				0.3					0.4	60	60		60														
Hairaton	AFG	3,6	126	2.2	2.1	0.8	0.6						0.3	1.0	0.5				1.1	0.5		114	115	8	11						7	10	20			95	12	
Batken	KGZ	0	35	2.1	2.2	0.2	1.1	0.4			0.2			0.2	0.3							48	49		10	9			10			9	9					
Zuun Khatavch	PRC	4	60	1.8	1.8	0.3	0.4	0.3	0.3			0.3				0.3					0.4	15	15		15														
Torugart	PRC	1	49	1.7	1.7	0.2					0.2					1.4						4	4										4						
Zamyn Uud	MON	4	1	1.3	1.3														1.3			124	124													124		
Karamik	TAJ	2,3,5	6	0.7	0.8	0.2	0.3		0.2													75	76	23	49		4											
Karasu	KAZ	1	79	0.3	0.3	0.1						0.1	0.1		0.2							30	25	11						7	4		16					
Ak-Tilek	KGZ	1	23	0.2	0.3	0.1								0.1	0.2							14	13	9								7	5					
Torugart	KGZ	1	1	0.2	0.2	0.1	0.1															18	18		18													
Khunjerab	PRC	5	1	0.2	0.2	0.1					0.1																												
Aul	KAZ	3	4	0.1	0.1	0.1																																
Kairak	KAZ	1	1	0.1	0.1	0.1																																
Troitsk	RUS	1	1	0.1	0.1	0.1																																

A. Border Security / Control, **B.** Customs Clearance, **C.** Health/Quarantine, **D.** Phytosanitary, **E.** Veterinary Inspection, **F.** Visa/Immigration, **G.** GAI/Traffic Inspection, **H.** Police Checkpoint / Stop, **I.** Transport Inspection, **J.** Weight/Standard Inspection, **K.** Vehicle Registration, **L.** Emergency Repair, **M.** Escort/Convoy, **N.** Loading/Unloading, **O.** Road Toll, **P.** Waiting/ Queue

Appendix 9:
Activities at Road BCPs, Inbound

Duration (hrs)

BCP	Country	Corridor	Count	Total Average	Total Median	Activities A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Spin Buldak	AFG	5,6	51	42.7	40.9	0.4	27.7				0.5			0.4							14.1
Torkham	AFG	5,6	451	31.1	6.3	1.0	24.0				0.6	0.8	0.5		0.5		0.9			0.5	11.8
Shirkhan Bandar	AFG	2,5,6	99	9.4	9.3	0.4	0.5	0.3	0.3	0.3	0.4				0.5	0.4			4.0	0.4	2.1
Tazhen	KAZ	2,6	90	7.9	7.9	0.9	1.3	0.4	0.5	0.8			0.4	0.5	0.5	0.4					3.7
Konysbayeva	KAZ	3,6	85	7.6	7.9	0.8	1.4	0.7	0.7			0.3	0.5	0.6	0.6	0.4					3.4
Farap	TKM	2,3	57	7.5	7.2	0.8	1.3	0.6	0.4	0.4	0.6		0.3	0.5	0.5	0.4				0.6	3.1
Fotehobod	TAJ	2,3,6	9	7.0	7.0	0.9	1.4		0.7						0.6						3.4
Sarahs	TKM	3	62	6.2	5.8	0.8	1.2	0.3	0.4		0.6		0.3	0.4	0.5	0.4				0.5	2.3
Dautota	UZB	2,6	118	6.1	6.5	0.5	2.6	0.3	0.4	0.3	0.2		0.2	0.5	0.5	0.5					3.2
Irkeshtan	KGZ	2,5	157	5.7	5.6	0.3	0.6	0.3	0.3	0.3	0.2				0.5	0.4				0.7	3.3
Nizhni Pianj	TAJ	2,5,6	62	5.5	7.2	1.2	0.5				0.6	0.1	0.5				0.7		0.6	0.6	3.7
Alat	UZB	2,3	71	5.4	5.2	0.7	1.1	0.3	0.5				0.3	0.3	0.5	0.5					2.5
Chaldovar	KGZ	1,3	10	5.2	5.2	0.7	1.3		0.6				0.3		0.5						3.2
Kulma	TAJ	0	166	5.2	5.6	0.3	0.5	0.3	0.3	0.3	0.2			1.3	0.5	0.4					4.0
Dusti	TAJ	3	117	4.0	2.9	0.5	1.4	0.3	0.4	0.3	0.4		0.3	0.3	0.2	0.2			0.3		2.8
Yarant	MON	4	15	3.4	3.3	0.2	1.4	1.2													0.5
Khorgos	KAZ	1	48	3.3	3.3	0.2	2.7				0.2										0.3
Zamyn Uud	MON	4	360	2.8	2.4	0.6	1.2	0.5			0.0	0.3			0.3	0.3			0.1	0.2	0.4
Karamik	TAJ	2,3,5	62	2.8	4.0	0.4	0.5	0.3	0.3	0.3				0.2	0.5	0.3		3.0			2.0
Kurmangazy	KAZ	6	37	2.5	2.2	0.8							0.2								1.7
Torugart	KGZ	1	49	1.9	2.1	0.1	0.5	0.1			0.2			1.1	0.3						
Altanbulag	MON	4	60	1.6	1.6	0.3	0.3	0.3	0.3						0.3	0.3					
Bichigt	MON	4	60	1.0	1.1	0.3	0.3		0.3							0.3					
Karamik	KGZ	2,3,5	6	0.6	0.7	0.2	0.4														
Karasu	KAZ	1	23	0.4	0.4	0.1						0.1	0.1	0.1	0.3						
Kordai	KAZ	1	2	0.3	0.3	0.1									0.3						
Ak-Tilek	KGZ	1	79	0.2	0.3	0.1								0.3	0.2						
Khunjerab	PAK	5	1	0.2	0.2	0.1					0.1										
Aul	KAZ	3	17	0.1	0.1	0.1															
Jana Jol	KAZ	1,6	9	0.1	0.1	0.1															
Veseloyarsk	RUS	3	4	0.1	0.1	0.1															
Torugart	PRC	1	1	0.1	0.1	0.1															
Kairak	KAZ	1	1	0.1	0.1	0.1															
Troitsk	RUS	1	1	0.1	0.1	0.1															

Cost (US$)

BCP	Country	Corridor	Count	Total Average	Total Median	Activities A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Spin Buldak	AFG	5,6	51	99	34	11	82				7			7							
Torkham	AFG	5,6	451	219	231	30	171				48	8	9		18		20			9	7
Shirkhan Bandar	AFG	2,5,6	99	443	466	15	27	10	10	10	71				20	6			93	185	
Tazhen	KAZ	2,6	90	135	133	24	42	15	18	55			12	22	15	17					
Konysbayeva	KAZ	3,6	85	164	165	33	45	26	28			6	17	34	18	18					
Farap	TKM	2,3	57	261	309	18	24	11	8	5	79		4	81	14	6				153	
Fotehobod	TAJ	2,3,6	9	80	75	23	31		11						15						
Sarahs	TKM	3	62	300	298	16	24	10	11		77			5	5	12	6			160	
Dautota	UZB	2,6	118	108	96	20	41	8	5	10	5			8		5		135			
Irkeshtan	KGZ	2,5	157	343	170	16	137	9	10	10	23				93	5				950	
Nizhni Pianj	TAJ	2,5,6	62	92	94	12	50				13	2	8				20		7	14	
Alat	UZB	2,3	71																		
Chaldovar	KGZ	1,3	10	75	78	32	44		20				10		20						
Kulma	TAJ	0	166	156	154	18	61	13	12	12	20			16	51	5					
Dusti	TAJ	3	117	112	143	13	28	4	6	3	5		6	5	14	3			80		
Yarant	MON	4	15	224	222		143	81													
Khorgos	KAZ	1	48	328	333		328														
Zamyn Uud	MON	4	360	118	161	36	110	12												12	
Karamik	TAJ	2,3,5	62	110	154	14	32	10	10	10	4			3	47	5		73			
Kurmangazy	KAZ	6	37	32	30	31							5								
Torugart	KGZ	1	49	37	37	12	7	6			16			21	4						
Altanbulag	MON	4	60	8	8			3												5	
Bichigt	MON	4	60	7	8				3											4	
Karamik	KGZ	2,3,5	6	31	31	10	21														
Karasu	KAZ	1	23	21	21	10						7	4	7	9						
Kordai	KAZ	1	2	10	10	5									4						
Ak-Tilek	KGZ	1	79	12	13	9								8	4						
Khunjerab	PAK	5	1																		
Aul	KAZ	3	17																		
Jana Jol	KAZ	1,6	9																		
Veseloyarsk	RUS	3	4																		
Torugart	PRC	1	1																		
Kairak	KAZ	1	1																		
Troitsk	RUS	1	1																		

A. Border Security / Control, **B.** Customs Clearance, **C.** Health/Quarantine, **D.** Phytosanitary, **E.** Veterinary Inspection, **F.** Visa/Immigration, **G.** GAI/Traffic Inspection, **H.** Police Checkpoint / Stop, **I.** Transport Inspection, **J.** Weight/Standard Inspection, **K.** Vehicle Registration, **L.** Emergency Repair, **M.** Escort/Convoy, **N.** Loading/Unloading, **O.** Road Toll, **P.** Waiting/ Queue

Appendix 10:
Activities at Rail BCPs, Outbound and Inbound

RAIL BCPs, Outbound

Duration (hrs)

BCP	Country	Corridor	Count	Total Average	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Towraghondi	AFG	6	35	29.7	29.3												0.4										
Naushki	RUS	4	60	25.8	12.0																25.8						
Khorgos	PRC	1	52	22.7	25.6												2.6		1.6					23.0		0.5	
Ala Shankou	PRC	1,2	146	20.2	19.0												2.9							17.4	10.0		
Erenhot	PRC	4	137	9.6	7.9												3.8				7.9	4.5		19.5			
Zamyn Uud	MON	4	115	6.7	4.8											1.0	0.6	0.9			6.0						

Cost (US$)

BCP	Country	Corridor	Count	Total Average	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Towraghondi	AFG	6	35	299	299												81										
Naushki	RUS	4	60																								
Khorgos	PRC	1	52	98	83												75		92						18		
Ala Shankou	PRC	1,2	146	69	65												65								26		
Erenhot	PRC	4	137	113	113												113										
Zamyn Uud	MON	4	115	75	80					75																	

RAIL BCPs, Inbound

Duration (hrs)

BCP	Country	Corridor	Count	Total Average	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Altynkol	KAZ	0	52	54.0	56.5					3.2						1.2	3.1				15.2		23.2	23.9	11.5	0.5	11.7
Erenhot	PRC	4	115	45.3	24.5					45.3																	
Dostyk	KAZ	1,2	145	44.4	42.5					2.9				3.0		0.5	2.2				8.7		18.6	26.4	7.8	10.0	83.3
Zamyn Uud	MON	4	137	20.6	17.0			1.5		1.3				3.0		2.5	2.0		1.4		10.5	13.5	18.9		8.8		
Sukhbaatar	MON	4	60	11.1	8.8						1.0					1.7	0.9				7.5						
Serkhet Abad	TKM	6	26	7.3	7.3												3.5										
Keles	UZB	3,6	67	3.5	3.3												3.5										
Farap	TKM	2,3	61	3.5	3.3												3.5										

Cost (US$)

BCP	Country	Corridor	Count	Total Average	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Altynkol	KAZ	0	52	638	705					359							327										
Erenhot	PRC	4	115	267	305					267																	
Dostyk	KAZ	1,2	145	486	425					326							160										
Zamyn Uud	MON	4	137	56	39			15		36							25	50		97							
Sukhbaatar	MON	4	60	19	19												19						5				
Serkhet Abad	TKM	6	26	50	50												50										
Keles	UZB	3,6	67	104	95												104										
Farap	TKM	2,3	61	127	130												127										

A. Load Cargoes, **B.** Unload Cargoes, **C.** Fix Cargo Shift, **D.** Remove Excess Cargo, **E.** Transload at Gauge Change Point, **F.** Pick-up and Deliver Wagons, **G.** Replace Inoperable Wagons, **H.** Emergency Repair, **I.** Train Classification, **J.** Document Errors, **K.** Reissue Transit Documents, **L.** Customs Inspection, **M.** Technical Inspection, **N.** Commercial Inspection, **O.** Sanitary/Phyto-sanitary Control, **P.** Busy Reloading Facilities, **Q.** Faulty Handling Equipment, **R.** No wagons available, **S.** Restriction on Entry, **T.** Marshalling, **U.** Waiting for Priority Trains to Pass, **V.** Other reasons for Waiting

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