CENTRAL ASIA REGIONAL ECONOMIC COOPERATION
TRADE FACILITATION

CAREC CPMM
CORRIDOR PERFORMANCE MEASUREMENT & MONITORING

ANNUAL REPORT 2014

CAREC

CENTRAL ASIA REGIONAL ECONOMIC COOPERATION
TRADE FACILITATION

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

Tel. (632) 632 5945
Email: yqian@adb.org

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

Tel. (632) 632 6960
Email: yuebinzhang@adb.org

Jeff Procak
Regional Cooperation Specialist,
EAPF, East Asia Department
Asian Development Bank

Tel. (632) 632 5701
Email: jtprocak@adb.org

Maria Cristina Lozano Astray
Regional Cooperation Specialist,
EAPF, East Asia Department
Asian Development Bank

Tel. (632) 632 4285
Email: clozano@adb.org

Trade Facilitation Team
Max EE Khong Kie
Andy Sze
Maria Theresa Damsani
Romelie Manalo
Julie Robles
Julius Santos

ANNUAL REPORT 2014

CAREC

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

For more information, log on to CAREC Federation of Carrier and Forwarder Association (CFCFA) website **http://cfcfa.net/** and visit the CPMM page on **http://cfcfa.net/cpmm/.** To learn more about the CPMM methodology, visit **http://www.adb.org/publications/carec-corridor-performance-measurement-and-monitoring-forward-looking-retrospective**.

NOTE

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

Table of Contents

Figures, Tables and Boxes

Abbreviations

ADB	–	Asian Development Bank
AFG	–	Afghanistan
APTTA	–	Afghanistan-Pakistan Transit Trade Agreement
ASYCUDA	–	Automated SYstem for CUstoms DAta
BCP	–	border crossing point
CAREC	–	Central Asia Regional Economic Cooperation
CBTA	–	Cross Border Transport Agreement
CFCFA	–	CAREC Federation of Carrier and Forwarder Associations
CIQ	–	China inspection and Quarantine services
CPMM	–	Corridor Performance Measurement and Monitoring
CV	–	coefficient of variation
ETA	–	Estimated Time of Arrival
EU	–	European Union
GAI	–	State Automobile Inspectorate
ICBC	–	International Centre for Border Cooperation
ISAF	–	International Security Assistance Force
KAZ	–	Kazakhstan
KDT	–	KedenTrans Service
KGZ	–	Kyrgyz Republic
kph	–	kilometer per hour
KTZ	–	Kazakhstan Temir Zholy
KZT	–	Kazakhstan Tenge
MON	–	Mongolia
PAK	–	Pakistan
PIFFA	–	Pakistan International Freight Forwarders Association
PRC	–	People's Republic of China
RUS	–	Russia
SWD	–	Speed with delay
SWOD	–	Speed without delay
TAJ	–	Tajikistan
TAPI	–	Turkmenistan-Afghanistan-Pakistan-India
TCD	–	time-cost-distance
TEU	–	twenty-foot equivalent unit
TFI	–	Trade Facilitation Indicator
TIR	–	Transports Internationaux Routiers
TTFS	–	Transport and Trade Facilitation Strategy
UNCTAD	–	United Nations Conference on Trade and Development
US	–	United States
WEBOC	–	Web-Based One Customs system
XUAR	–	Xinjiang Uygur Autonomous Region

Executive Summary

Corridor Performance and Monitoring and Measurement (CPMM) is a region-wide initiative that examines the efficiency of six transport corridors in serving the needs of 10 countries participating in the Central Asia Regional Economic Cooperation (CAREC) program and their principal trading partners. CAREC's Transport and Trade Facilitation Strategy (TTFS) provides CPMM's mandate. CPMM contributes four Trade Facilitation Indicators (TFIs) to the CAREC Development Effectiveness Review (DEfR).

A total of 2,718 data samples were collected in 2014. The split between road and rail shipments was 80% and 20%, respectively. Analysis shows that all TFIs (with the exception of TFI1) displayed progress (see Table 1).

TFI1: Time taken to clear a border crossing, in hours

Average border crossing time lengthened from 10 hours to 14 hours in 2014. This can be attributed substantial delays in crossing time at two newly included BCPs: Peshawar-Torkham and Chaman-Spin Buldak, both located at the Pakistan-Afghanistan border. Prior to 2014, data samples from Pakistan were reported separately. Following the adoption of a refined TTFS 2020 in late 2013, CAREC corridors were formally realigned to include Pakistan. CPMM correspondingly adjusted its coverage in 2014 and reflects that adjustment in this report. Trucks crossing these locations required an average of 36 hours at each location. Despite the signing of the Afghanistan-Pakistan Transit Trade Agreement (APTTA 2010), drivers continued to report difficulties in crossing these BCPs. Delays are mainly due to waiting in queue and trans-loading cargoes. Consistently mentioned was the 55-km stretch separating Peshawar and Torkham. There are several border security and police checkpoints along this section which tend to result in 'friction' and open up avenues for unofficial payments.

Border crossing time for railways increased slightly (from 29.9 hours to 32.6 hours). CPMM data samples were collected for Corridor 1 and 4. Both corridors revealed different reasons for border crossing delays. Restriction on trains to enter the customs control zone was the main cause in Alashankou, PRC, while capacity-related constraints (such as re-loading within train station and lack of wagons) were the primary causes in Dostyk, Kazakhstan.

At the PRC-Mongolia BCP at Erenhot-Zamyn Uud, the border crossing was similarly lengthy. The main cause was the need to trans-load cargoes from trucks to rail wagons. The high volume of such transfer at Erenhot resulted in a longer waiting time. At Zamyn Uud, the three trans-loading stations have limited material handling equipment. The transfer of cargoes such as construction materials is still done manually.

TFI2: Costs incurred at a border crossing point, $

TFI2 showed an overall decrease of 27% year-on-year. This improvement was explained by the reduction of border crossing fees for both road and rail transport. The TFI2 for road dropped 25% while that for railways decreased by 35%. For road transport, the reduction in border crossing fees at BCPS along Corridors 1 and 4 were significant enough to offset increases in fess at other BCPs resulting in a net reduction.

In rail transport, the cost of railway gauge change also declined significantly. In fact, this cost registered a drop from $450 in 2012 to $120 in 2014. This cost constituted 50% of the border crossing cost at Dostyk, so the decrease had a noticeable impact on TFI2.

TFI3: Costs incurred to travel corridor section, $ per 500 km per 20-ton cargo

TFI3 measures the average cost of transport. Since shipments cover different distances and carry different payloads, all data are standardized to 500 km with a cargo weight of 20 tons to offer meaningful comparisons. Considering all corridors, TFI3 reported a drop of 7% in 2014. This improvement was explained by road transport efficiency and cost reduction; the reduction would have been bigger if not for an increase in rail transport costs.

All CAREC corridors showed a reduction in transport cost except Corridor 3. Specifically, 3b was a costly corridor for truckers. Between 2012 and 2014, TFI3 for Corridor 3b rose from $1,580 to $2,897. The section in Tajikistan was particularly expensive. On the other hand, notable improvements were seen in Corridor 4. Completion of the road connecting Choyr to Zamyn Uud was instrumental in reducing vehicle operating cost. In fact, TFI3 dropped 22% in 2014 for Corridor 4. Many transit shipments that could only previously use trains could now be shipped on trucks. For instance, used cars were previously transported from Erenhot to Ulaanbaatar only by rail. Now at Zamyn Uud, used cars from Erenhot are unloaded from the trains and shippers then hire drivers to drive the used cars along the new road to Ulaanbaatar. This not only reduced time but also lowered the freight cost. This is an important example of how paved roads could significantly improve transportation.

For railways, both Corridor 1 and 4 reported increases in travel costs of 23% and 68%, respectively. This was due to the improved CPMM methodology which captures a more comprehensive cost structure compared to previous years. However the impact of falling oil prices may be a mitigating factor in 2015.

TFI4: Speed to travel 500 km on CAREC corridor section, in kph

Average travelling speed using Speed Without Delay (SWOD) improved from 36 kph to 40 kph. The improvement in speed was recorded mainly in Corridors 5 and 6. Speed With Delay (SWD) registered a smaller increase (from 20 kph to 21 kph). Trucks moving on Pakistan's roads tend to be fast, but problems occur at border crossing. For trains, border crossing times remain lengthy, resulting in depressed SWD, particularly at Alashankou-Dostyk (PRC-KAZ).

Impact of New BCPs on TFIs

In 2014, the addition of Peshawar-Torkham and Chaman-Spin Buldak BCPs to the sample coverage had an outsized impact on TFI1. Lengthy border crossing time reported at these 2 BCPs constituted the primary cause of the 41% jump in TFI1 (overall) and the 78% increase in TFI1 (road). If the same data are included for earlier years (CPMM began collecting data in Pakistan in 2012, following Pakistan's entry to CAREC), then TFI1 actually registered an improvement over the three year period 2012-2014. At these BCPs, customs clearance and long waiting time in queue resulted in lengthy border crossing time.

Performance of Railway Transport

This is the sixth year of CPMM and the first time a more comprehensive study on railways can be conducted. With new railway data samples, fresh insights can be obtained. In this report, the following are compared:

- Chongqing-Duisburg express train service
- Railways in PRC moving to Central Asia
- Railways in PRC moving to Mongolia

Using a 40-foot container as a unit of carriage over a distance of 500 km, the cost of each option above is analyzed. In absolute terms, the express train service is expensive as it takes $9,600 to move a container over approximately 12,000 km. However in terms of cost per 500km, it is actually the lowest. This service is also much faster, taking just 18 days (compared to 45 days at sea). If the overall cost of this service can be further reduced to $6,600, this can give viable competition to the maritime route, especially for high value cargoes and those that incur costly inventory carrying cost.

Samples of train movement from Chongqing or Urumqi to Almaty are also analyzed. Each has its merits and limitations. Chongqing-Almaty showed that the cost per 500 km is lower, but the border crossing time was longer. Conventional trains from Urumqi spend an average of only 15 hours at Alashankou, whereas those which originated from Chongqing wait 90 hours at Alashankou.

In 2014, CPMM compared rail service performance from Chongqing-Ulaanbaatar to Tianjin-Ulaanbaatar. Both routes cost about $5,000 per shipment. The train from Chongqing took about 20 days to reach Ulaanbaatar while that from Tianjin only took 10-14 days (including dwell time in Tianjin seaport). It was observed that the trains along Chongqing-Ulaanbaatar spent much time held up in railway stations due to restrictions upon entry. If these restrictions can be addressed, then Chongqing could become a new source of imports for Mongolia instead of relying solely on Tianjin seaport.

I. Background

CAREC adopted a Transport and Trade Facilitation Strategy (TTFS) in 2007 and a corresponding Implementation Action Plan in 2008. The TTFS defined six CAREC transport corridors. The TTFS mandates that measuring and monitoring of corridor performance be conducted to assess the impact of TTFS implementation and document anticipated improvements in corridor efficiency. In 2013, a review was done and key recommendations were proposed that refines the TTFS. With its key objectives aligned to the overall CAREC 2020 strategy, TTFS re-affirmed the need to measure and assess progress made.

Against this background, CPMM was conceived to quantify actual improvements along the six CAREC Corridors. Its methodology is built on UNESCAP's Time-Cost-Distance methodology (see Appendix 2). 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 by members of the CAREC Federation of Carrier and Forwarder Associations (CFCFA). Recognizing that it is not possible for a single entity to undertake such a huge study, national transport and trade associations were engaged from the beginning to conduct CPMM. Interested associations from each of the CAREC Member countries were invited for training on the CPMM methodology. To formalize the relationship, CAREC supported the founding of CFCFA, the umbrella for all CPMM participating associations. The members meet once a year to review the results of CPMM and recommend ways to improve transportation and trade facilitation. More information on CFCFA can be found at 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) railway transport operators are state-owned monopolies less inclined to publicize operational data. As such, road shipments initially accounted for more than 80% of CPMM data. However, with the renewed focus on railways in the refined TTFS, CPMM has also responded by enlarging rail samples. This mode now contributes about 20% of all samples and is expected to increase over time.

Carriage of goods, whether by road or rail, 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 produces high cost and requires a long time to ship goods in CAREC. 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 actual causes of transport inefficiency commonly encountered in CAREC. These details are documented in the following sections. Hopefully they can offer a helpful source of information and insights to the readers.

II. Data Description

CPMM is now supported by 13 transport associations from 8 countries (Afghanistan, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, PRC, Tajikistan, and Uzbekistan).[1] These transport associations represent freight forwarders, trucking companies, and road carriers. Each sample is an actual commercial shipment. Specific cost and time data are captured, recorded and aggregated before analysis is conducted. The data are verified and validated by field consultants. The CAREC Trade Facilitation Team in Asian Development Bank is the overall manager of CPMM.

Data Sample

A total of 2,718 samples were collected and analyzed in 2014. This represents an increase of 23.4% over 2013. A new methodology for collecting data on railway movements was developed and implemented. This is in line with the refined CAREC Transport and Trade Facilitation Strategy (TTFS) 2020 that places additional emphasis on railway transport. A new set of rail-related activities was adopted to allow for a better analysis of bottlenecks in railway movement.

Data Profile

In 2014, shipments by road accounted for 2,158 samples (79.4%) and 560 samples (20.6%) record rail shipments. Of the 2,718 samples, 544 (20%) carried perishables. There were 526 (96.7%) by road, and 18 (3.3%) by rail, confirming again the importance of road transport to move perishable consignments. There were 2,480 samples (91.2%) that crossed at least one international border, with the remaining 238 (8.8%) domestic movements of goods.

The use of Transports Internationaux Routiers (International Road Transport, or TIR) Carnets remained low compared to the period before 2013, when Russia's Federal Customs Service imposed restrictions on the implementation of this Convention. Out of 2,158 road shipments, 816 (37.8%) utilized the TIR, similar to the 34% utilization in 2013.

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.

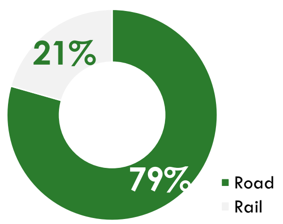
Using CPMM data, the following conclusions can be made:

- Afghanistan is heavily reliant on imports. Most imports enter Afghanistan from Pakistan and Iran. The border crossing point Torkham is especially important for the movement of goods. Afghanistan has a strategic location in CAREC, as it bridges Central and South Asia. Transit movements were evident from the cargo shipments moving between Hairatan, Shirkhan Bandar and Torkham (Corridor 5 and 6). The re-activation of the TIR system, and the revised Afghanistan-Pakistan Transit Trade Agreement (APTTA) held promise for Afghanistan to take on a more important role, although implementation requires stronger commitment.
- Kazakhstan is an integral CAREC country – it plays a critical role in the region's economy, trade, and transport. The 'Western China-Western Europe' route goes through Corridor 1b. Progress in developing and expanding the container express train connecting PRC to Europe is further testimony to the importance of Corridor 1 and Kazakhstan's role. Of particular importance are the border crossing points at Dostyk (Corridor 1a, railways) and Khorgos (Corridor 1b, both road and rail). Corridor 1c is heavily used as a transit route for Kyrgyz transport operators to reach Russian markets.
- Kyrgyz Republic is a net exporter of fruits and vegetables. The country supplies these products to Kazakhstan through Ak Tilek via Corridor 1c. Imports came through Torugart at 1c, while transit shipments from PRC to Central Asia cross at Irkeshtan on Corridor 5. Textiles are another important export commodity, where the goods moved through Kazakhstan to Russia. The country has confirmed its decision to join the Eurasian Economic Union, in May 2015. It is expected that this event may result in trade diversion and thus change prevailing traffic patterns.
- Mongolia's trade has experienced some challenges since 2012, due to the decrease in demand for commodities from PRC, reducing cross border shipments of copper and minerals. An import-reliant

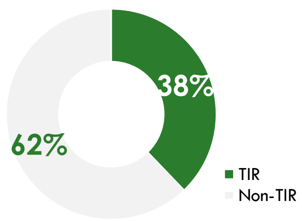
1 A 14th association from Turkmenistan will contribute to CPMM beginning 2015.

Data Profile

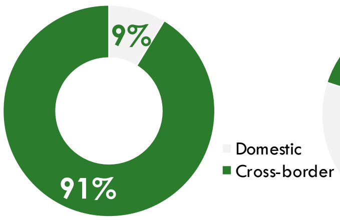
Mode of Transport



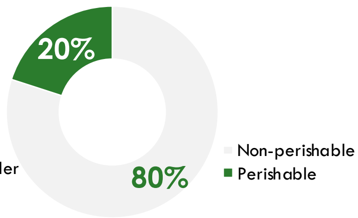
Use of TIR



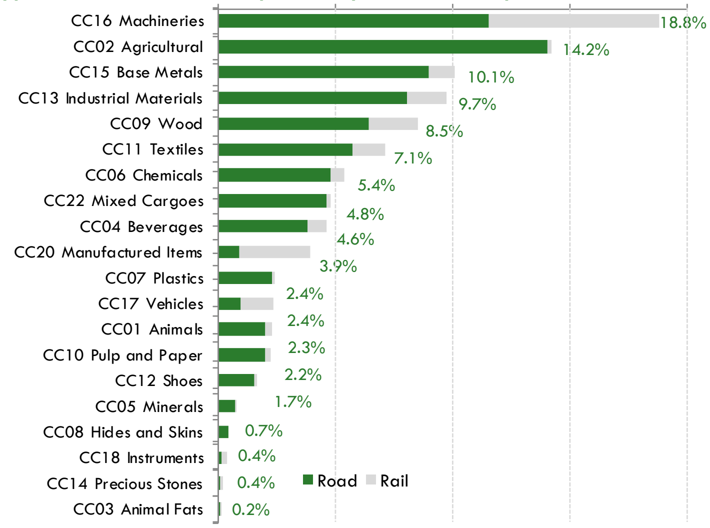
Cross-border Transport



Perishable Cargo

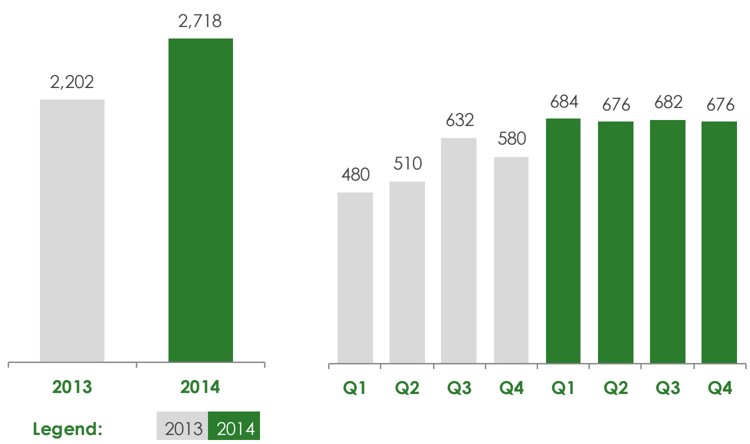


Type of Commodities Transported, by mode of transport



Data Sample

TCD sample

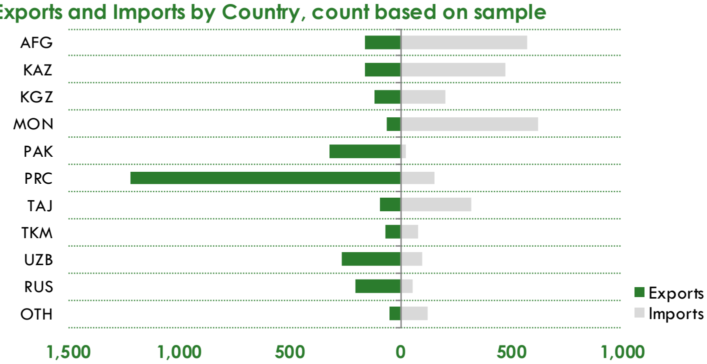


2014 TCD Sample by Association

Country	Association	2014 Q1	2014 Q2	2014 Q3	2014 Q4	2014	2013
AFG	AAFFCO	60	60	60	60	240	240
KAZ	KFFA	30				30	180
KGZ	AIRTO	24	26	22	19	91	12
	FOA	60	60	60	57	237	180
MON	NARTAM	60	60	60	60	240	240
	MNCCI	60	60	60	60	240	240
PAK	PIFFA	60	60	60	60	240	0
PRC	CQIFA	30	50	60	60	200	60
	IMAR	60	60	60	60	240	240
	XUAR	60	60	60	60	240	240
TAJ	ABBAT	30	30	30	30	120	120
	AIATT	60	60	60	60	240	150
UZB	ADBL	90	90	90	90	360	300
Total		684	676	682	676	2,718	2,202

Cargo Movement

Exports and Imports by Country, count based on sample



Origin	AFG	KAZ	KGZ	MON	PAK	PRC	TAJ	TKM	UZB	RUS	OTH	Total
	Destination											
AFG	140				22							162
KAZ		1	78						81	1	1	162
KGZ		45				15				47	13	120
MON						60						60
PAK	316				2							318
PRC	119	242	37	550			141	20			107	1216
TAJ							92			1		93
TKM		4	11				41		15			71
UZB		159					47	59		1		266
RUS		3	66	70		60				3	1	203
OTH		17	10			20						47
Total	575	471	202	620	24	155	321	79	96	53	122	2,718

economy, Corridor 4 plays an indispensable role in supporting Mongolia's exports, imports, and transit traffic. Rail transport is the dominant mode for shipments of manufactured goods from PRC through Zamyn Uud, while copper cathodes, molybdenum, wood, and other items were exported to PRC. In 2014, CPMM began the collection of road shipments along a new CAREC Corridor 4c via Bichigt, which is mainly used for the movement of energy products. CPMM data also reveal that the newly completed road along 4b linking Zamyn Uud to Choir has reduced the time and cost to move items. Furthermore, shippers are diverting cargoes from rail to road as road transport offers greater flexibility in arranging shipments.

- Pakistan plays a strategic role in CAREC as one of only two countries featuring with deep water seaports. The Karachi seaport is a gateway for goods destined to Kabul and other Afghanistan cities. Its potential is validated in TTFS 2020, which features realigned CAREC Corridors 5 and 6 extending into Pakistan. The new sub-corridor 5b reflects the potential of the Karakorum Highway connecting PRC and Pakistan directly, while the four sub-corridors in Corridor 6 link key cities such as Islamabad, Karachi, Lahore, and Gwadar to Central Asia. Yet CPMM highlights the challenges in transit and border crossing. Both BCPs at Peshawar and Chaman show cumbersome and inefficient border crossing, consistently ranking as the most time-consuming nodes.

- PRC is an exporter of consumer and manufactured goods to Central Asia, while the country imports energy and minerals (mostly from Kazakhstan). The new train terminal at Khorgos has relieved the stress-point at Alashankou (previously the only BCP along PRC's western border that supported railway transport). In 2014, a new economic vision 'Silk Road Economic Belt' espoused by the government renewed the strategic importance of Central Asia, resulting in accelerated developments in the western regions of PRC. Kashi is designated as a Special Economic Zone. Construction of new and modern logistics facilities are well underway at Khorgos. The Chongqing-Duisburg line now allows consumer electronics to reach Europe in 16 days, much faster than via maritime transport.

- Tajikistan faces constraints in regional trade. The mountainous terrain, under-developed infrastructure, and harsh winters, as well as trade facilitation measures that do not yet feature modern approaches and risk based practices hamper the movement of goods. Transit traffic has been affected due to the closure of Karamyk to international goods and vehicles by Kyrgyz Republic. In 2014, more transit shipments passed through Kulma Pass, and moved to Dushanbe via Murgab. The country is also actively looking at greater collaboration with Afghanistan and Turkmenistan on the development of a new railway link that can provide an outlet for its exports to the Middle East and the Caucasus. Tajik drivers are especially active in CAREC Corridors 3, 5, and 6.

- Turkmenistan is an important transit country for Central Asia bound cargoes from Bandar Abbas. As such, heavy traffic flows via Farap. The new corridor 6d is designated to highlight the potential of rail transport in Turkmenistan.

- Uzbekistan's location, relatively sizeable population, and diversified economic base provide strong competitive advantages in regional trade. Heavy movement is seen in the west, through Turkmenistan, using the Bandar Abbas seaport. To the north, Uzbek drivers cross Dautota into Kazakhstan before reaching Russia (Corridor 6). In the east, shipments of fruits and vegetables are sent to cities like Almaty through Yallama (Corridor 3). Finally, the southern BCP Termez supports exports to Afghanistan via rail while Hairatan facilitates the truck movement of transit and exports. CPMM shows Uzbek transport operators are generally competitive. However, it is not easy for transit shipments to move across Uzbekistan due to unconducive regulations and policies.

III. Trade Facilitation Indicators

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 aggregate 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)

The development of a CAREC Program Results Framework to serve as the basis for an annual comprehensive review of "development effectiveness" to track progress and achievements was endorsed by senior officials of CAREC in 2009. Indicators for trade facilitation were discussed and approved at the 2010 Regional Joint Transport and Trade Facilitation Meeting held in Tashkent, Uzbekistan. CPMM provides these indicators to the CAREC Development Effectiveness Review as one means of measuring progress in this priority area for the program.

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

Table 1: Trade Facilitation Indicators

			2013			2014		
			Mean	Median	Margin	Mean	Median	Margin
TFI1	Time taken to clear a border crossing point (hr)	Overall	10.0	5.3	± 0.5	14.1	5.8	± 0.5
		Road	5.6	4.2	± 0.2	9.9	4.8	± 0.4
		Rail	29.9	24.0	± 1.9	32.6	24.0	± 1.7
TFI2	Cost incurred at border crossing clearance (US$)		235	120	± 10	172	125	± 5
			236	100	± 12	177	125	± 6
			229	165	± 15	148	125	± 6
TFI3	Cost incurred to travel a corridor section (per 500km, per 20-ton cargo)		1,467	1,018	± 49	1,360	937	± 46
			1,596	1,124	± 57	1,359	938	± 51
			911	600	± 71	1,364	926	± 105
TFI4	Speed to travel on CAREC Corridors (kph)		20.0	18.2	± 2.2	20.8	20.6	± 1.7
			22.3	20.0	± 2.4	22.9	21.5	± 1.8
			13.3	9.8	± 4.0	11.4	9.2	± 2.4
SWOD	Speed without delay (kph)		36.3	34.2	± 2.8	40.2	41.4	± 2.1
			37.8	35.3	± 2.9	42.0	42.9	± 2.1
			31.7	30.1	± 7.8	32.2	26.7	± 5.8

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

TFI1 Time Taken to Cross a Border-crossing point

(in hours)

Highlights

- Both road and rail experienced an increase in average border crossing times.
- For road, the increase was driven by the jump in durations in Corridor 5 and 6. Peshawar-Torkham (PAK-AFG) and Chaman-Spin Buldak (PAK-AFG) caused the increase. CPMM began to assess the performance of these two BCPs formally only in 2014.
- For rail, the moderate lengthening of train border crossing time at Khorgos-Altynkol (PRC-KAZ) in Corridor 1 resulted in the slight increase of TFI on 2014.

In 2014, TFI1 was 14.1 hours, a year-on-year increase of 43%. Both modes of transport reported lengthier border crossing times. Comparing 2013 and 2014 data, road samples reflected an increase from 5.6 hours to 9.9 hours (up 76%), while rail samples experienced an increase from 29.9 hours to 32.6 hours (up 9.03%).

The causes of the increase were attributed to longer border crossing time in Corridor 1 (driven by rail transport) as well as Corridor 5 and 6 (caused by road transport). In particular, the average TFI1 for Corridor 5 (road) was 28.9 hours, a substantial increase from 8.5 hours in 2013. The sharp increase resulted from the formal inclusion of new Corridor 5 and 6 BCPs in CPMM.

Before 1 January 2014, CPMM segregated Pakistan's data from the six Corridors. The country was formally included into CPMM once the CAREC Corridors were clearly defined and the corridor realignments and extensions in Pakistan were officially approved. This report devotes a section discussing the impact of this structural change in the CPMM indicators (see Section V).

Road Transport

In 2014, TFI1 for road jumped 76%. The causes were mainly due to longer border crossing time in Corridor 5 and 6. TFI1 for Corridor 5 averaged 28.9 hours, and 9.6 hours in Corridor 6.

What contributed to this increase? Two locations were the main contributing factors. They are Peshawar-Torkham and Chaman-Spin Buldak, both Pakistan-Afghanistan BCPs. Peshawar is a populous city in the northern region of Afghanistan and a transport hub serving trade from and to Afghanistan. However, the lead time to complete formalities here ranges from 25 to 32 hours. The main reasons are due to lengthy customs clearance, escort/convoy and loading/ unloading. Under APTTA 2010, Afghan trucks could send

Figure 1: Time Taken to Cross a Border-crossing point, in hours

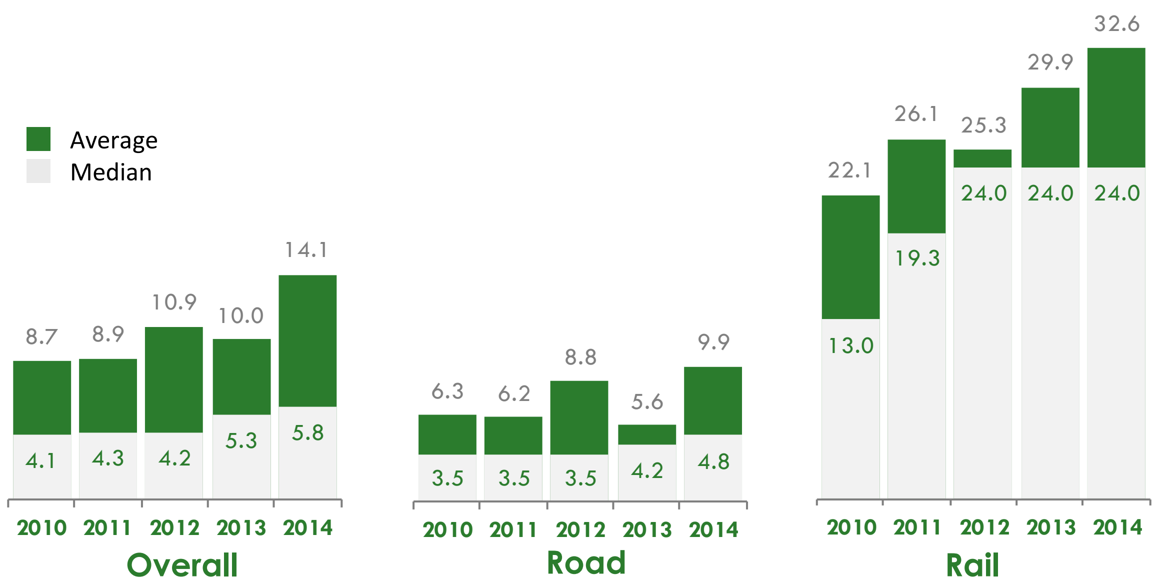


Table 2: Duration of Activities Spent on BCPs, Road Transport

	Count							Average, in hours						
		Corridors							Corridors					
Road	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Border Security / Control	3,660	940	408	422	854	152	884	0.5	0.2	0.7	0.5	0.6	0.8	0.7
B. Customs Clearance	3,837	750	438	352	780	630	887	7.7	0.8	1.3	1.2	9.4	25.4	5.1
C. Health / Quarantine	1,659	231	119	158	669	47	435	0.6	0.7	0.4	0.2	0.9	0.5	0.3
D. Phytosanitary	1,752	171	263	266	425	40	587	0.4	0.1	0.4	0.4	0.3	0.2	0.4
E. Veterinary Inspection	644	72	10	150	115	40	257	0.3	0.1	0.3	0.3	0.6	0.3	0.3
F. Visa/Immigration	1,053	159	96	148	481	50	119	0.2	0.1	0.6	0.2	0.0	0.2	0.4
G. GAI/Traffic Inspection	542	118	10	70	245	-	99	0.3	0.2	0.2	0.3	0.3	-	0.3
H. Police Checkpoint / Stop	835	110	155	119	122	49	280	0.3	0.2	0.3	0.3	0.3	0.1	0.2
I. Transport Inspection	880	145	66	218	14	31	406	0.4	0.3	0.4	0.4	0.3	0.3	0.4
J. Weight/Standard Inspection	1,969	385	371	114	507	3	589	0.4	0.2	0.5	0.5	0.2	1.1	0.5
K. Vehicle Registration	1,137	10	181	120	466	40	320	0.3	0.2	0.4	0.3	0.2	0.4	0.4
L. Emergency Repair	4	1	-	-	-	-	3	1.0	0.2	-	-	-	-	1.3
M. Escort / Convoy	8	-	-	-	-	6	2	1.1	-	-	-	-	1.0	1.2
N. Loading / Unloading	1,254	100	35	94	456	226	343	2.5	4.4	3.4	0.7	2.8	2.1	2.2
O. Road Toll	494	-	104	4	261	4	121	0.3	-	0.5	0.7	0.3	1.0	0.4
P. Waiting/ Queue	2,303	196	399	161	310	425	812	5.0	5.4	2.8	5.2	0.4	11.9	4.2

exports to Wagah border (Pakistan-India), where there is a large demand, but in practice, Afghan trucks are stopped at Peshawar. Afghan exports are compelled to trans-load onto Pakistan trucks for the Peshawar to Wagah section. For goods entering Afghanistan, trucks have to wait in convoy at D.I. Khan. Movement is only permitted during day time and in convoy due to security regulations, so the waiting time is significant and erratic.

Likewise, trucks crossing Chaman-Spin Buldak experience 36 to 60 hours of delay. The contributing factors are complicated customs clearance and lengthy waiting time. No trans-loading of goods occurs here as Pakistan-registered trucks carried goods from Karachi to Kandahar.

Pakistan officially joined CAREC in 2010. The country's CAREC Corridor coverage was only finalized in 2013. In 2014, the data in Pakistan were integrated into TFI analysis[2] for the first time. This inclusion of the two BCPs produced an elevated value for TFI1 and these two BCPs were quickly identified to be one cause of degraded BCP performance. Due to these additions, TFI1 for 5a, 5c, and 6c increased substantially. The respective TFI1 average values at these three sub-corridors were 11.3 hours, 48 hours, and 12.4 hours in 2014. This new and elevated TFI value is expected to persist over the next few years, thus 2014 could be said to be the start of a new baseline.

On a positive note, observable improvements occurred at Corridor 1b. The average TFI1 value decreased from 17.8 hours to 11.9 hours from 2013 to 2014. This sub-corridor used to be the most time-consuming BCP from 2010 to 2013. As a heavily congested gateway for PRC exports to Central Asia, trucks had to wait for long periods to cross Khorgos. As construction and capacity expansion took place under the framework of 'International Centre for Border Cooperation Centre (ICBC)', new facilities like warehouses, wholesale centers, and separate vehicle inspection zones were built to simplify border crossing. Although the border crossing time still remains long relative to other BCPs, improvements are expected in the future when the ICBC becomes fully operational and new border crossing facilities are developed to complement the soon-to-be-completed Almaty-Khorgos highway.

Delays in Road Transport

Customs clearance was the border crossing activity that was most frequent and time-consuming in 2014. While the average clearance time was 7.7 hours, Corridor 4 and 5 had

2 CPMM commenced in Pakistan in 2012. The data were analyzed separately and reported as a stand-alone section. Thus, its values were not reflected in the TFIs in the past.

Figure 2: Manual Trans-Loading of Goods

Loading and unloading of trucks is common in Central Asia, and CPMM identified it as one of the top five reasons for delay at border crossing. Due to cabotage restrictions, change of truck is needed at border and so goods need to be trans-loaded. The use of pallets and material handling equipment such as forklifts is not common. Trans-loading is done manually, it is laborious and time-consuming.

the longest duration at 9.4 hours and 25.4 hours respectively. This also explains why these two corridors had the lowest SWD.

In Corridor 4, long customs clearance times usually happened at Zamyn Uud for Mongolia-bound shipments. Truck drivers go to the Import/Export Document office to submit documents for the clearance process. Sometimes errors due to mistranslation arise and the forms have to be re-submitted. Customs clearance in Corridor 5 was particularly long due to formalities at seaports and BCPs. The origin for many road samples was Karachi seaport. Under the APTTA 2010 Agreement, only 5% of Afghanistan containers are to be examined. However, Afghanistan freight forwarders report that the Pakistan authorities impose 100% scanning and inspection of Afghanistan containers, and 20% of those were physically examined. Another common cause of errors leading to long clearance time is due to mistranslation. The contents on the Bill of Lading have to be translated from Pashto/Dari to English. When there are errors, it takes a few days to correct the documents.

Rail Transport

TFI1 rose from 29.9 hours in 2013 to 32.6 hours in 2014. This was driven by Corridor 1, where average border crossing time changed from 40.2 hours to 42.9 hours. Samples on rail traffic along 1a and 1b were captured in 2013 and 2014. Examining the results, it was determined that the TFI1 increase was caused by 1b.

Average border crossing time at 1a (Alashankou-Dostyk) remained unchanged (43.4 hours in 2013 and 44.2 hours in 2014). On the other hand, time-consuming activities at Khorgos-Altynkol in 1b reported a sizeable jump, from 4.1 hours to 30.6 hours.

Why was there a sizeable increase in border crossing time for trains at Khorgos-Altynkol in 1b? This was in part a result of the revised CPMM methodology to study railway transport. CPMM in 2014 used an improved method to consider rail-specific activities (that could occur inside a railway terminal, container freight station, or even at the shipper's factory). This comprehensive approach resulted in a more accurate recording of the time taken for cargoes to move across borders in trains. The figures for Khorgos-Altynkol are now more consistent with those recorded at other railway BCPs.

The new results showed that delays occurred at the following:

- At Khorgos (PRC), the delay was chiefly attributed to 'Restriction on Entry', in which duration ranged 10-18 hours. This happened when a bottleneck developed at the BCP, which resulted in oncoming trains having to stop on the tracks or in the preceding railways terminal. When would a bottleneck developed? This happens when the rate of processing in a railway terminal is slower than the rate of incoming trains. According to interviews, Khorgos[3] facilities on the PRC side of the border have a high capacity to process trains, but Altynkol does not have comparable capacity. This mismatch thus affected Khorgos too, because the throughput in the entire railway system is only as fast as the slowest node.
- At Altynkol (Kazakhstan), the reasons for delays were varied. They are chiefly caused by time to reload cargoes. This was mainly attributed to the insufficient capacity of the BCP to handle the volume of trains. The second most important reason was marshalling. This involves the classification or the re-alignment of the wagons to form a new section of a train based on the destinations. This is usually done in a marshalling yard. Other reasons were due to trans-load at the break in gauge, as the Kazakhstan system uses the 1,520 mm gauge but the PRC rail network features

3 For instance, Khorgos has two trans-loading centers and six internal tracks to handle movement of cargoes on trains. This BCP is projected to have a capacity for 19 million tons annually by 2020.

Table 3: Duration of Activities Spent on BCPs, Rail Transport

Rail	Count							Average, in hours						
		Corridors							Corridors					
	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Load Cargoes	2	2	-	-	-	-	-	1.0	1.0	-	-	-	-	-
B. Unload Cargoes	18	18	-	-	-	-	-	8.9	8.9	-	-	-	-	-
C. Fix Cargo Shift	20	-	-	-	20	-	-	1.9	-	-	-	1.9	-	-
D. Remove Excess Cargo	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. Transload at Gauge Change	540	280	-	-	260	-	-	11.7	5.3	-	-	18.5	-	-
F. Pick-up and Deliver Wagons	44	-	-	-	44	-	-	1.0	-	-	-	1.0	-	-
G. Repair Inoperable Wagon	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H. Emergency Repair	5	5	-	-	-	-	-	4.0	4.0	-	-	-	-	-
I. Train Classification	96	79	-	-	17	-	-	3.3	3.3	-	-	3.1	-	-
J. Document Errors	1	-	-	-	1	-	-	12.0	-	-	-	12.0	-	-
K. Reissue Transit Documents	280	64	-	-	216	-	-	1.9	0.5	-	-	2.3	-	-
L. Customs Inspection	724	406	-	-	318	-	-	4.0	4.0	-	-	4.1	-	-
M. Technical Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. Commercial Inspection	20	-	-	-	20	-	-	2.3	-	-	-	2.3	-	-
O. Phyto-sanitary Control	2	2	-	-	-	-	-	48.0	48.0	-	-	-	-	-
P. Busy reloading facilities	760	271	-	-	489	-	-	19.9	30.3	-	-	14.1	-	-
Q. Faulty handling equipment	6	6	-	-	-	-	-	9.2	9.2	-	-	-	-	-
R. No wagons available	229	209	-	-	20	-	-	16.3	15.7	-	-	23.1	-	-
S. Restriction on entry	184	164	-	-	20	-	-	36.7	36.8	-	-	36.2	-	-
T. Marshalling	150	150	-	-	-	-	-	7.8	7.8	-	-	-	-	-
U. Priority trains to pass	23	23	-	-	-	-	-	21.8	21.8	-	-	-	-	-
V. For Other Reasons	46	46	-	-	-	-	-	7.8	7.8	-	-	-	-	-

the international standard 1,435 mm gauge. Trans-loading at the break in gauge happens at the 'import' country. The number and capacity of trans-loading centers is critical to this operation.

Delays in Rail Transport

Table 3 shows that 'Waiting due to Re-loading' is a serious problem, as it is both frequent (ranked first) and lengthy (ranked third). This refers to activities inside the terminal waiting for the transfer of goods. At Alashankou-Dostyk (PRC-KAZ), Khorgos-Altynkol (PRC-KAZ) and Erenhot-Zamyn Uud (PRC-MON), this activity can be particularly long.[4] It can take 1 to 2 days for the shipment simply to wait in the terminal due to the ongoing transfer of goods for the prior trains.

Relative to other reasons, Customs clearance is frequent but not as time-consuming. Railways are heavily regulated and cultivate the impression that fewer chances of pilferage are present, thus cargo security is perceived to be higher. In the event, the clearance time is actually faster. An interesting comparison is that customs clearance is usually among the top three most frequent and time-consuming activities for road transport, but it is not even ranked in the top five most time-consuming reasons for rail.

'Restriction on Entry' and 'Waiting for Priority Trains' were ranked first and second in terms of the magnitude of delays. Although they were less frequent compared to other reasons, the delay was still sizeable. The lack of wagons has been mentioned in the past as a constraint that caused train delays. In 2014, this factor was included in the list of reasons and was ranked number four in importance. The next key reason was the lengthy trans-load time. This has been a persistent contributing factor to delays at the PRC border due to the break in gauge. PRC is expanding the trans-load capacity at BCPs like Alashankou by constructing more trans-loading terminals.

4 A freight forwarder operating in Altynkol reports that container trains can be processed within two hours or can take as long as 7 days, depending on the incentives provided to expedite processing.

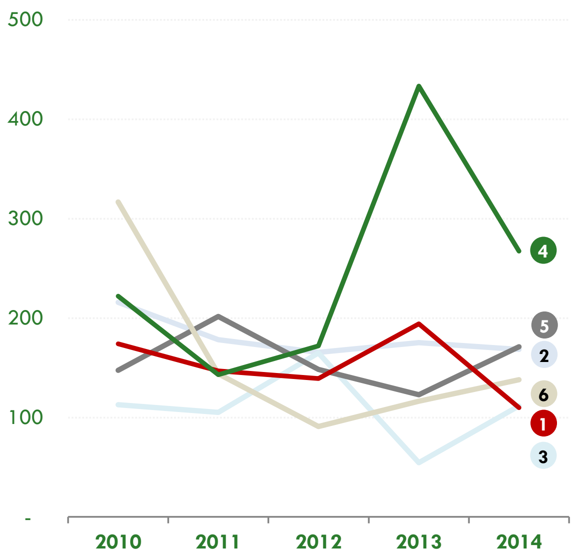
TFI2 Cost Incurred at Border Crossing Clearance

(in $)

Highlights

- Both road and railways showed improvement from 2013 to 2014. Average border crossing cost for road and rail dropped 25% and 35%, respectively.
- For road, the improvement came from reduced border crossing costs at Corridor 1 and 4. Both corridors showed a peak in 2013 which dropped in 2014, mirroring the pattern of TFI2.
- For rail, Corridor 1 and 4 were also the key reasons for the reduction. In particular, Dostyk showed a sizeable reduction in border crossing cost. The cost for trans-loading due to the break in gauge showed a lower cost from 2012 to 2014.

Figure 3: Average Border Crossing Cost, per corridor, in $



In 2014, TFI2 was $172, showing a reduction of 27% compared to 2013. Both road and rail reported a decline in average border crossing costs. TFI2 (road) dropped from $236 to $177 (-25%). Railways experienced a more significant reduction in percentage terms, from $229 to $148 (-35%).

Road Transport

Along CAREC corridors, average border crossing costs have fluctuated erratically. However, a marked improvement was observed from 2013 to 2014, where TFI2 was reduced by 25%.

This notable improvement came about due to the reduction of this cost in Corridor 1 and 4. Over a five year period (Figure 3), the TFI2 for each CAREC Corridor (road transport only) was analyzed and it appears that both Corridors 1 and 4 had significant correlation with the overall TFI2 for road. In both of these corridors, the border crossing costs peaked in 2013, and declined in 2014, thus producing the trend observed in TFI2. The TFI2 for Corridor 1 and 4 reduced by 43% and 38%, respectively.

Cost Drivers of Border Crossing

From Table 4, it can be concluded that:

- Customs clearance is the main cost driver. It is ranked top in both frequency and magnitude.
- Loading and unloading is another costly and frequently encountered activity. It happens at the origin and destination, as well as the BCP. Transport in CAREC works on a system of agreements (bilateral and multi-lateral). Without the proper agreements, trucks will need to trans-load at the BCP, introducing avoidable inefficiency.
- Harmonization can play a pivotal role in improving border crossing efficiency. Due to unharmonized procedures, certificates are sometimes not mutually recognized (e.g. weight certificates, health certificates). Vehicles will then be subjected to repeated activities at each border.
- Road toll is particularly high, but seldom encountered, in Corridors 2, 3, and 6.
- Escort and convoy is a costly activity in Corridor 5. This is due to the mandatory need for trucks moving in convoy at Peshawar and Quetta due to security concerns.

Figure 4: Cost Incurred at Border Crossing Clearance, in $

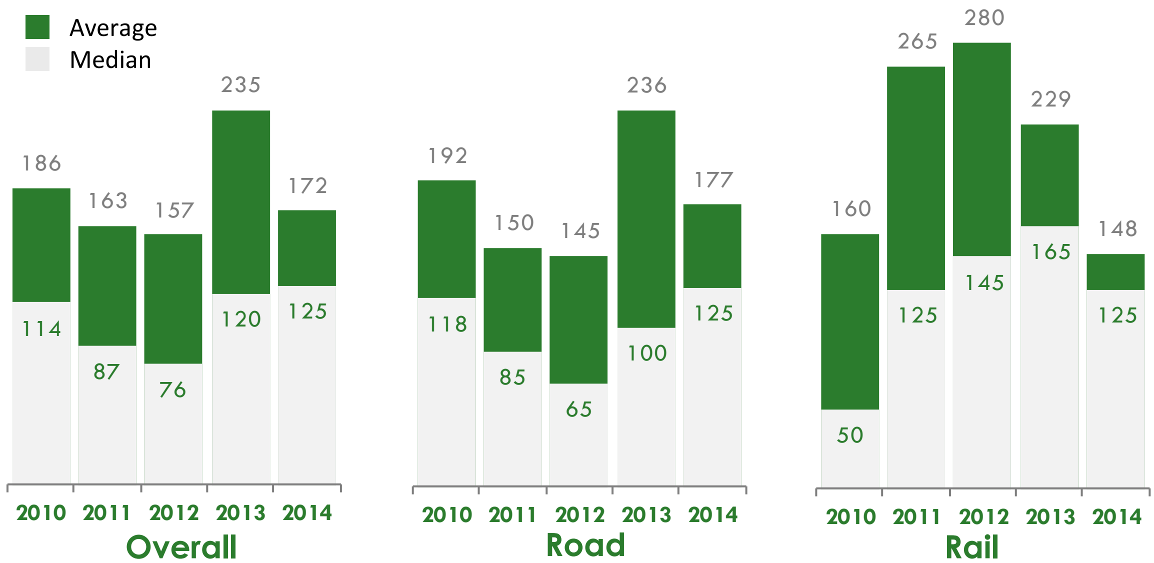


Table 4: Cost of Activities Spent on BCPs, Road Transport

	Count							Average, in $						
		Corridors							Corridors					
Road	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Border Security / Control	2,317	584	252	232	409	142	698	18	12	14	12	26	22	22
B. Customs Clearance	3,276	709	247	239	750	630	701	140	60	23	88	318	169	62
C. Health / Quarantine	1,343	208	77	143	499	47	369	18	46	10	5	19	4	9
D. Phytosanitary	1,105	163	139	197	127	40	439	9	9	10	7	6	3	11
E. Veterinary Inspection	567	66	6	136	79	40	240	6	8	5	5	9	3	5
F. Visa/Immigration	334	37	101	52	-	25	119	30	18	78	11	-	2	6
G. GAI/Traffic Inspection	205	96	-	32	-	-	77	11	11	-	18	-	-	6
H. Police Checkpoint / Stop	601	89	82	62	121	49	198	9	6	4	5	20	5	7
I. Transport Inspection	793	123	64	176	-	31	399	17	21	27	10	-	3	18
J. Weight/Standard Inspection	1,366	418	248	30	231	3	436	14	18	13	14	15	14	11
K. Vehicle Registration	656	9	143	144	-	40	320	7	18	8	3	-	2	8
L. Emergency Repair	1	1	-	-	-	-	-	5	5	-	-	-	-	-
M. Escort / Convoy	88	-	-	-	-	6	82	28	-	-	-	-	89	24
N. Loading / Unloading	1,041	59	-	-	437	206	339	100	337	-	-	103	80	67
O. Road Toll	819	-	104	4	586	4	121	48	-	161	167	6	87	149
P. Waiting/ Queue	73	55	-	-	18	-	-	8	8	-	-	6	-	-

Rail Transport

The pattern of border crossing costs from 2010 to 2014 is driven by four railway stations. They are namely: Alashankou-Dostyk (PRC-KAZ) and Erenhot-Zamyn Uud (PRC-MON).[5] Only Erenhot showed a slight increasing trend, while the other three stations displayed a declining pattern since 2012. In fact, the TFI2 trend mirrored that of Dostyk, which peaked in 2012 and dropped in the next two subsequent years (see Figure 5).

One reason for this pattern was the rolling stock fleet demonopolization exercise conducted in Kazakhstan. Readers may recall that this development was described in previous CPMM reports. To liberalize the market for rolling stock, multiple operators of locomotives and managers of wagon fleets were allowed. Leading the reform efforts, Kazakhstan Temir Zholy (KTZ) re-fashioned itself as a modern logistics enterprise and spun off KedenTrans Service (KDT) to manage its railway assets. During that year, the border crossing cost surged due to the increase in railway terminal handling fees. However, since that surge, the cost has come down steadily,

Figure 5: Average Border Crossing Cost, per rail BCP, in $

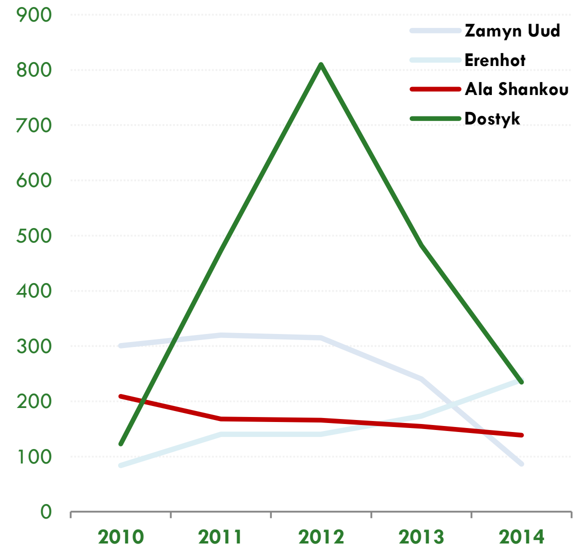


Table 5: Cost of Activities Spent on BCPs, Rail Transport

	Count							Average, in $						
		Corridors							Corridors					
Rail	Overall	1	2	3	4	5	6	Overall	1	2	3	4	5	6
A. Load Cargoes	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B. Unload Cargoes	18	18	-	-	-	-	-	65	65	-	-	-	-	-
C. Fix Cargo Shift	20	-	-	-	20	-	-	15	-	-	-	15	-	-
D. Remove Excess Cargo	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. Transload at Gauge Change	559	280	-	-	279	-	-	115	126	-	-	103	-	-
F. Pick-up and Deliver Wagons	34	-	-	-	34	-	-	90	-	-	-	90	-	-
G. Repair Inoperable Wagon	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H. Emergency Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I. Train Classification	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J. Document Errors	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K. Reissue Transit Documents	60	-	-	-	60	-	-	15	-	-	-	15	-	-
L. Customs Inspection	546	386	-	-	160	-	-	84	91	-	-	67	-	-
M. Technical Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. Commercial Inspection	20	-	-	-	20	-	-	97	-	-	-	97	-	-
O. Phyto-sanitary Control	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P. Busy reloading facilities	60	-	-	-	60	-	-	121	-	-	-	121	-	-
Q. Faulty handling equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R. No wagons available	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Restriction on entry	116	116	-	-	-	-	-	64	64	-	-	-	-	-
T. Marshalling	10	10	-	-	-	-	-	22	22	-	-	-	-	-
U. Priority trains to pass	3	3	-	-	-	-	-	19	19	-	-	-	-	-
V. For Other Reasons	1	1	-	-	-	-	-	39	39	-	-	-	-	-

5 Khorgos-Altynkol (PRC-KAZ) is only recently added after becoming operational toward the end of 2012. Thus, it only has bearing on the 2013 results.

possibly reflecting the effects of competition. For instance, CPMM data showed in 2012 that a westbound train crossing from Alashankou to Dostyk would have to pay $450 to $500 at Dostyk due to the break in gauge. In 2014, this cost dropped to $120. Gauge change services constituted a principal cost at border crossing (about 50%), and its reduction would influence the direction of change. Hence, with lower break in gauge costs at Dostyk, TFI2 for railways also decreased in 2014. It remains to be seen if this trend continues.

Cost Drivers of Border Crossing

In 2014, the most costly activity was the 'Trans-load at Gauge Change' in terms of frequency and magnitude of the cost. This activity is not optional since there is a break in gauge at the PRC border with neighboring countries.

There are four types of inspections conducted in the rail terminal. They are Customs, Technical, Commercial, and Sanitary/Phyto-Sanitary. Customs inspection is a standard requirement and is commonly encountered. Commercial inspection is called for when there is justification that the declared import or export value of a cargo in a train needs to be checked. This is especially applicable for imports when the importer attempts to under-declare the value of the imported items on the commercial invoice so as to reduce the import tax.

The collection and delivery of wagons is one of the business processes in a railway shipment. Loaded containers or wagons have to be moved to and from the factory siding and the railway terminal. Finally, unloading cargoes is normally done by heavy crane or forklift.

As a shipper, there are limited options to improve the efficiency of railway operations. The performance of the railways transport depends on three key elements: Competency of the railway operator, the coverage and condition of the rail network, and the availability of the rolling stocks. Shippers are the price takers of the business, since most railway operators are state-owned monopolies. However, genuine demonopolization and commercialization of the sector could open opportunities for greater efficiency, especially if private owners and operators are introduced. Freight forwarders in CAREC have expressed keen interest to own and manage their own rolling stock fleets, suggesting that they could in this way increase the availability of rolling stock.

Unofficial Payments

In 2014, 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 the carrier can receive a benefit over other carriers in the transit of goods. This benefit can be expedited processing of documents, waiver of penalties, or jumping queues to avoid long waiting time. By categorizing what are official and non-official payments, CPMM is able to distinguish the two and report accordingly.

How frequent is unofficial payment along CAREC corridors? The number of times an unofficial payment is demanded per activity is recorded and compared with the total number of times this particular activity is encountered (with and without unofficial payment). By dividing the 'count' of unofficial payment over the total number of samples, the **probability** of an unofficial payment can be calculated for each activity.

Based on CPMM findings in 2014, it appears that the top five activities most susceptible to unofficial payments were visa and immigration (42%), phyto-sanitary (17%), veterinary inspection (17%), vehicle registration (15%) and weight/ standard inspection (13%).

On the other hand, there are 'high count' activities that drivers encounter in the transit of goods. Although the probability is

Table 6: Likelihood of Unofficial Payments

	Activity	Count	%	Average
A.	Border Security / Control	2,545	10%	18
B.	Customs Clearance	3,908	6%	142
C.	Health / Quarantine	1,672	10%	21
D.	Phytosanitary	1,332	17%	8
E.	Veterinary Inspection	756	17%	5
F.	Visa/Immigration	515	42%	21
G.	GAI/Traffic Inspection	2,136	0%	7
H.	Police Checkpoint / Stop	2,361	0%	6
I.	Transport Inspection	2,155	0%	15
J.	Weight/Standard Inspection	1,751	13%	15
K.	Vehicle Registration	916	15%	7
L.	Emergency Repair	41	0%	41
M.	Escort / Convoy	409	0%	87
N.	Loading / Unloading	1,455	0%	95
O.	Road Toll	2,007	7%	28
P.	Waiting/ Queue	175	3%	7

not as high (due to a large base), these activities can also harbor 'rent-seeking' opportunities. Such activities include customs clearance, border security and control, police checkpoint, transport inspection, and GAI/traffic inspection.

What is the expected (average) size of unofficial payments? The average size of unofficial payment is aggregated below. However it must be pointed out that the actual amount depends on the location in the CAREC corridor network.

An interesting observation is made when the two tables are compared. The top five high probability activities differ from the list of activities with the highest amount paid for unofficial payments. Drivers explained that the amount paid for the high probability activities (such as immigration, phyto-sanitary and veterinary inspections) tends to be small. On the other hand, a driver needs to spend a larger sum of money to pay parties involved in clearance or escort/convoy as the waiting time for these activities could stretch over a few days.

Dealing with Unofficial Payments. Shippers rely on experienced carriers to consider such practices and estimate the costs. Such practice has become a cost of doing business. Experienced carriers using drivers who move goods regularly across the region can project the unofficial amount on top of what is mandated, and thus advise the shippers. In truth, it is always difficult to deal with unofficial payments. Drivers do not receive a receipt for such payment, and it makes it tough to support such claims at times. The drivers could harbor a motive to make additional money. On the other hand, the amount for such 'facilitation' can vary across BCPs, and even differ due to personnel changes. One driver recalled the need to pay a well-established 'fee' at a BCP for customs clearance, but when the official is transferred to another BCP and a new person arrived, the amount changes. Other drivers who work for a trucking company inform that, apart from BCPs, they do not experience delays en route and report that their employer has made the necessary arrangements to eliminate these delays.

To combat the problems associated with unofficial fees, the following actions have been adopted:

- Rotating key positions in areas where such practice is particularly susceptible
- Implementing electronic payment to minimize the use of cash
- Issuance of proper receipts for every transaction
- Installing surveillance device such as closed circuit television to monitor staff actions
- Using a single electronic window to minimize the contacts with multiple parties

TFI3 Cost Incurred to Travel a Corridor Section

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

Highlights

- Average cost of railway transport has risen above that of trucks.
- Trucking cost showed a broad reduction year-on-year, with the exception of Corridor 3. Carriage by road remained high in this corridor due to travelling in Tajikistan.
- Railways showed a substantial increase driven by Corridor 4 (Mongolia).

In 2014, TFI3 dropped 7% to $1,360. There is a positive and negative development for this indicator. The cost of transport reported a decrease for trucks, but a sharp increase for trains. The situation has become serious because this is the first time that TFI3 of rail exceeds road.

Any shipper will know that a shipment by rail in which the average length of haul exceeds 500 km, should be at least 20% less expensive compared to using a truck. The difference in the CAREC context is a product of lower trucking cost. Between 2013 and 2014, TFI3 dropped from $1,596 to $1,359 (-15%). On the other hand, railways cost surged from $911 to $1,364 (+50%). Both transport cost in Corridor 1 and 4 contributed to the increase, but the latter accounted for a large magnitude.

Road Transport

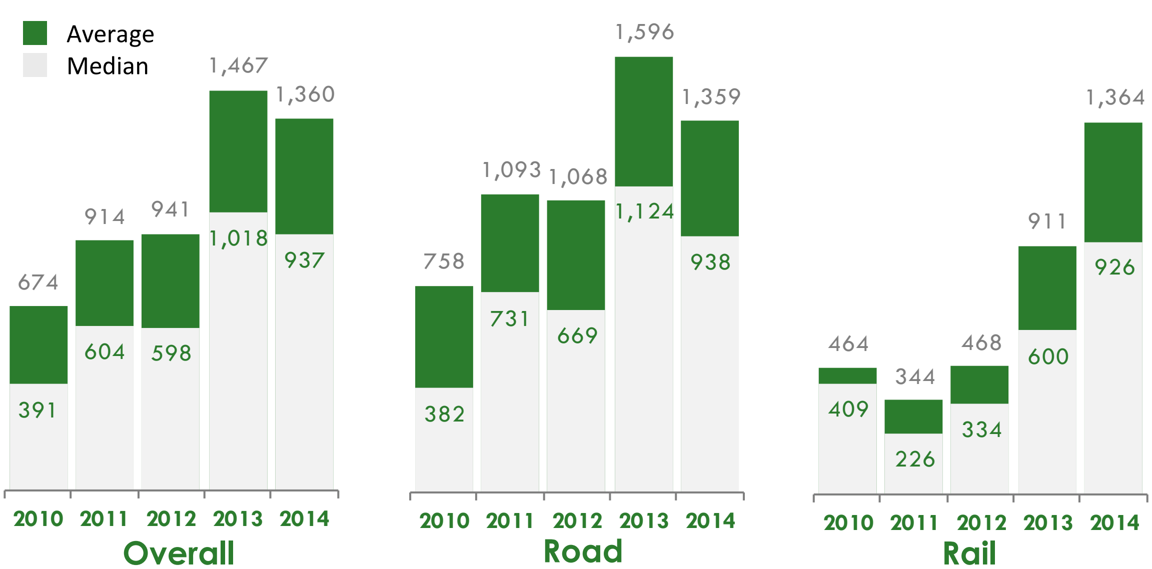
TFI3 (measured in $ per 500 km per 20-ton of cargo) displayed an improvement across all six corridors with the exception of Corridor 3. Corridors 3 and 5 still showed a higher cost compared to the other corridors, but the latter showed a lower TFI3.

Corridor 3b continued to be the most costly sub-corridor to travel. From 2012 to 2014, TFI3 increased consistently year-on-year: $1,580, $2,393, and $2,897, respectively. The increase in transport cost in 3b resulted in the slight increase of TFI3 for Corridor 3 in 2014. This was attributed to high trucking costs in Tajikistan. For instance, a 25-ton shipment of fruits and vegetables from Tursunzade to Nizhni Panj (262 km) cost $3,500. In fact, trucking costs rose steadily from January to December. At the beginning of the year, the trucking cost averaged $2,800 only. This translated to $6,600 per 500 km of travel, which is very high in the region.

Not all movements in Tajikistan are so costly. There is substantial traffic with PRC on the non CAREC Corridor through Kulma Pass. Many drivers compete for traffic on this route, thus lowering the transport cost.

Corridor 4 contributed to the improvement of TFI3 in 2014. The cost of shipment along Corridor 4 dropped by nearly 22% year on year. The completion of the road section from

Figure 6: Cost Incurred to Travel a Corridor Section, per 500-km, per 20-ton, in $



Sainshand to Zamyn Uud provided new opportunities to increase the efficiency of road transport. For instance, used automobile vehicles were previously transported in containers on trains along Corridor 4b. This was necessary as there were no paved roads in the past in the southern section of Mongolia. However using containers to move vehicles is not an efficient way as the space in the container compartment is not fully utilized. (A typical 40-foot container can hold four vehicles, usually tilted at an angle inside the container.)

With the new paved road completed, shippers now can unload the used vehicles at Zamyn Uud from the containers, and hire drivers to drive the vehicles to Ulaanbaatar. This effectively reduces the shipment cost for moving goods between Zamyn Uud and Ulaanbaatar.

Rail Transport

Both Corridors 1 and 4 registered an increase for TFI3, recording a rise of +23% and +68%, respectively. Corridor 4 showed a sizeable jump.

The phenomenon of railway transport being more expensive than trucks is unusual. It is uncertain whether this anomaly will continue. Rationalizing public service obligations with which railway operators are burdened and spinning off non-core assets may help to improve performance and reduce costs. With the reduction of crude oil price in 2014 and continuing into 2015, the transport sector might enjoy a lower cost of transportation, thus lowering TFI3.

Table 7: Breakdown of Cost Incurred to Travel a Corridor Section, $ per 500 km per 20 tons

	Average			%	
	Total	Transit	Activity	Transit	Activity
Overall	1,360	1,130	230	83%	17%
1	1,180	977	203	83%	17%
2	513	390	123	76%	24%
3	2,348	2,138	210	91%	9%
4	1,269	942	327	74%	26%
5	2,050	1,845	205	90%	10%
6	769	503	266	65%	35%
Road	1,359	1,129	230	83%	17%
1	1,123	944	179	84%	16%
2	513	390	123	76%	24%
3	2,348	2,138	210	91%	9%
4	1,126	715	410	64%	36%
5	2,050	1,845	205	90%	10%
6	769	503	266	65%	35%
Rail	1,364	1,136	228	83%	17%
1	1,278	1,034	244	81%	19%
2	-	-	-	-	-
3	-	-	-	-	-
4	1,478	1,272	206	86%	14%
5	-	-	-	-	-
6	-	-	-	-	-

TFI4 Speed to Travel on CAREC Corridors

(in kilometers per hour)

Highlights

- Road speed reported a small increase.
- Railways showed a drop in speed.
- Corridor 4 and 5 continued to be the slowest moving routes.

Between 2013 and 2014, TFI4 increased from 19.9 kph to 20.8 kph. Slight improvement was seen in the speed for road shipments. Unfortunately, trains experienced a small reduction.

Road Transport

CPMM uses SWOD and SWD to measure speed. TFI4 uses SWD, which considers both travelling time and stoppage time. Thus, TFI4 is sensitive to improvement or deterioration on two factors – the quality of the transport infrastructure, as well as efficiency of the border crossing procedures.

TFI4 for road rose from 22.3 - 22.9 kph, essentially maintaining the same range of speed. However the SWOD reported an increase of 11% year-on-year, while the same period showed the SWD increasing only by 2%. This implied that the trucks are actually travelling faster on the road.

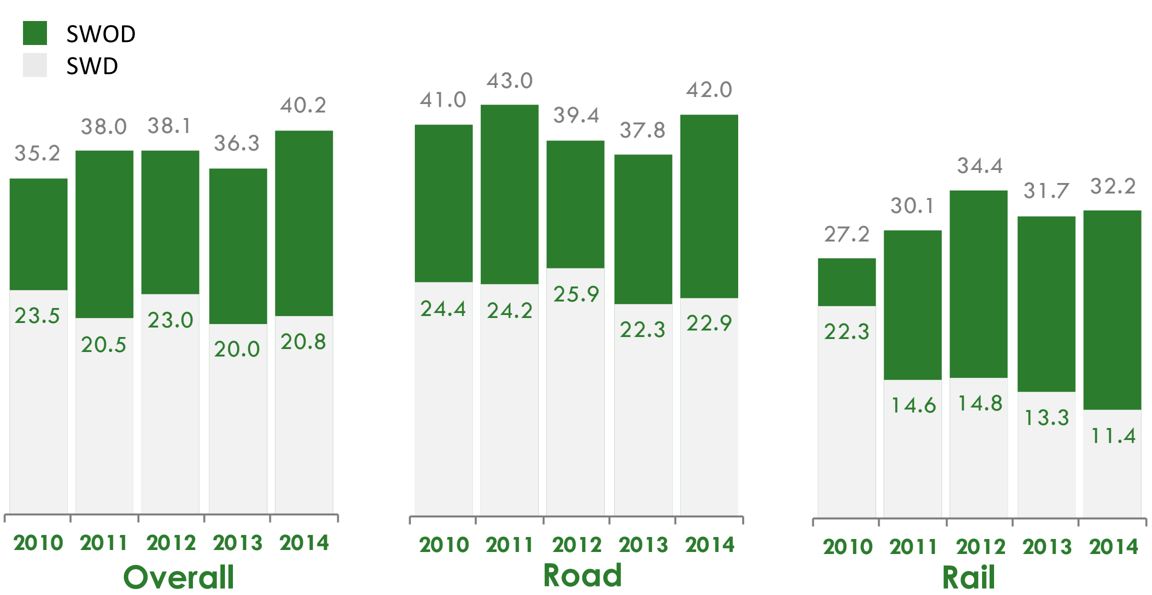
Of the six CAREC Corridors, Corridor 4 and 5 remained the slowest for trucks to traverse (Figure 8).

In terms of SWOD, the range of speeds was between 36 - 49 kph. The three CAREC Corridors which registered the fastest speeds were 2, 3, and 6. In terms of SWD, the range of speeds was between 17 - 28 kph. The top three CAREC Corridors were 1, 3, and 6. Corridor 4 and 5 continued to be the slowest corridors.

A positive note is observed in Corridor 4, despite the fact that it is still slow compared to the other CAREC Corridors. In 2013, the SWOD and SWD for trucks along Corridor 4 were 24 kph and 15 kph, respectively. One year later, the SWOD and SWD rose to 37 kph and 20 kph. Substantial improvement in SWOD (54%) was observed. Following completion of an ADB-financed road rehabilitation project, Mongolian truck drivers who used Corridor 4 extensively reported a shorter travelling time from Choyr to Zamyn Uud.

In terms of SWOD, speeds ranged from 31 - 56 kph. The three CAREC sub-corridors which registered the fastest speeds were 5c, 3a, and 1b. In terms of SWD, speeds ranged from 13 - 36 kph. The top three CAREC sub-corridors were 1a, 6a, and 3a. Constituent sub-corridors of Corridors 4 and 5 continued to be the slowest.

Figure 7: **Speed to Travel on CAREC Corridors, in kph**



Some observations can be made:

- With the exception of sub-corridor 5c, the fastest sub -corridors measured by SWOD and SWD tend to pass through Kazakhstan and Uzbekistan. In general, the road sections in those countries are in better condition, and the terrain is also less mountainous (compared to Kyrgyz Republic and Tajikistan).
- Interestingly, sub-corridor 5c is the 'fastest' by SWOD and 'slowest' by SWD. This indicates that infrastructure is good but the border crossing delays are very cumbersome, thus creating a large difference between the two speeds. This is explained by the very long border crossing times experienced by trucks when crossing Peshawar-Torkham and Chaman-Spin Buldak, both lying on 5c.

Rail Transport

Speed is affected by border crossing time. Since TFI4 uses SWD which considers both travelling and dwell time (incurred when the train stops at border), border crossing time (TFI1) exercises considerable influence on TFI4. A longer border crossing time results in a slower overall speed. Thus, TFI1 and TFI4 should be inversely correlated, but the correlation coefficient is not always 1.0 since there are also other possible factors that affect SWD.

Using data in 2013 and 2014, TFI1 (rail) went up by 9%, and TFI4 (rail) dropped by 14.28%. CPMM focused on three BCPs that handled rail traffic. They are Alashankou-Dostyk (PRC-MON), Khorgos-Altynkol (PRC-KAZ) and Erenhot-Zamyn Uud (PRC-MON). Each of these BCPs requires 1-2 days to complete border crossing formalities. In extreme cases, the delays could take up to weeks. Details are given in the corridor section.

Railway data were collected for 2014 in two Corridors – Corridor 1 and 4. The latest data re-affirmed the following observations:

- Corridor 1 is superior to Corridor 4. This has been observed in the past and the performance continued into 2014.
- Corridor 1 had SWOD and SWD of 45 kph and 16 kph. Corridor 4 had SWOD and SWD of 22 kph and 8 kph.

For both Corridors 1 and 4, border crossing delays were the major reasons for the low SWD observed.

Variation in Sample

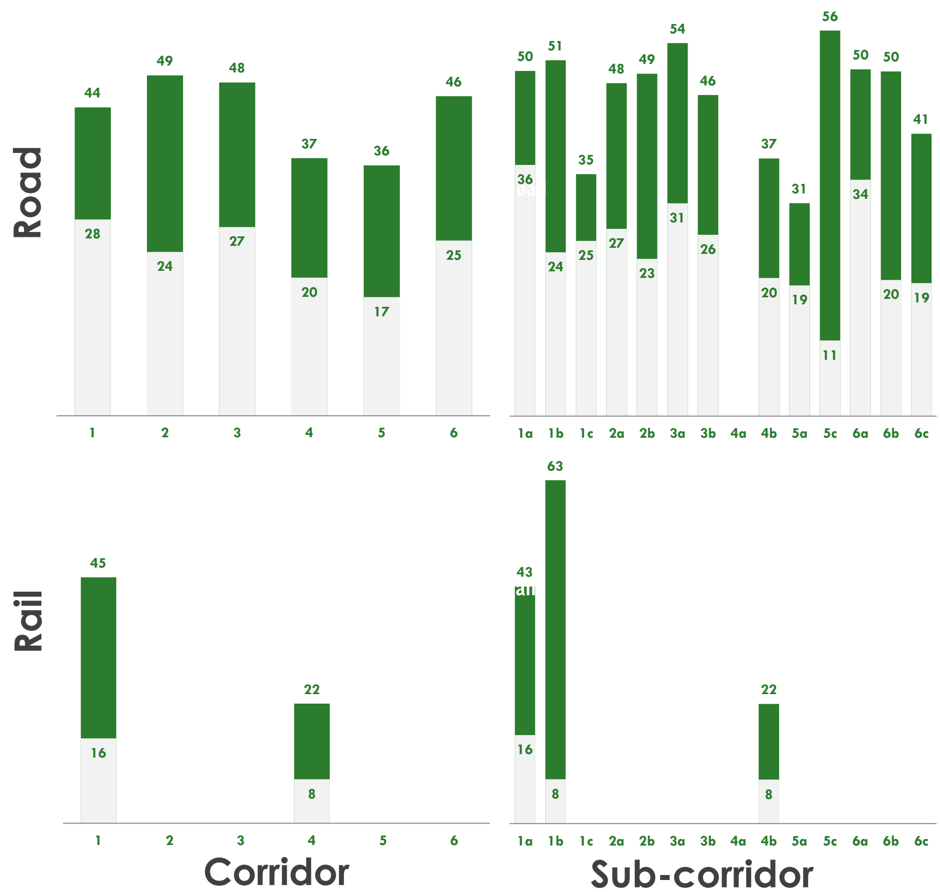
The Coefficient of Variation (CV) is used to compare the relative reliability and predictability of a shipment's delivery time. Apart from cost considerations, shippers will also be concerned if the estimated times of arrival (ETA) are unpredictable or inconsistent. For instance, if a shipment is expected to arrive on Monday but instead is delivered two weeks later, perishables could have higher spoilage rate, or the customer may cancel the order.

In 2014, a key observation was that corridors supporting slow-moving traffic also had higher CVs (Corridors 4 and 5). This situation presents major disincentives for dispatching cross border shipments along those two corridors and through the countries concerned.

Using a matrix to analyze the performance of each sub-corridor by SWD and CV, the results reveal slow-moving, less dependable corridors. Those routes in Quadrant 1 have low speed and high CV, making them unattractive to shippers. In 2014, sub-corridors 4b and 6c were located in this quadrant. Thus, it is imperative for the authorities in those countries concerned to intervene and improve the performance of transport. However, noting that the metric used is SWD, this does not mean the physical infrastructure is weak. SWD is derived from travelling and stoppage time. The results suggest that a combination of non-physical impediments (such as lengthy, cumbersome, intrusive border crossing formalities) and physical capacity constraints at BCPs could be the main reasons for low SWD and high CV.

Long waiting time in queue is often cited as a reason for delay, in both trucks and trains. Waiting time is a function of the capacity of the border crossing point. If the border crossing point is poorly designed, requiring multiple inspections in a serial manner and intentionally made to be inefficient so as to extract rents, then long waiting time ensues. This increases total time for shipment (leading to a low SWD) and unpredictability, generating a higher CV.I If CAREC corridor managers collaborate to reduce waiting time by adopting layout, procedural, and policy reforms, shorter waiting times will translate to faster SWD and lower CV.

Figure 8: Speed Indicators for Road and Rail Transport

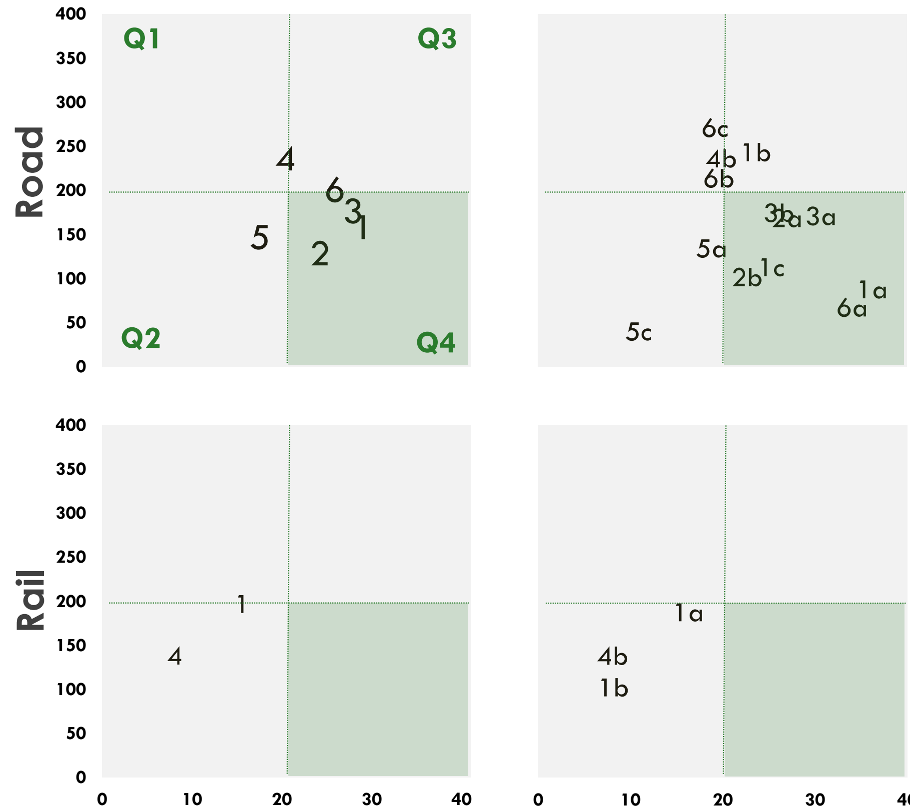


■ **Speed Without Delay (SWOD), in kph.** This metric considers travellng speed only, i.e. when the delivery truck moves on the road, or when the train moves on the tracks. When the vehicle is stationary, the time is not counted.

■ **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.

■ SWOD
■ SWD

Figure 9: Variation in Speed Estimates per Corridor



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.

IV. Performance of CAREC Corridors

C1 Corridor 1

Europe–East Asia

Connecting Europe to East Asia, Corridor 1 is a multi-modal route that connects three countries (Kazakhstan, Kyrgyz Republic, and PRC). It has 13,600 km of roads and 12,000 km of railways. Corridor 1 supports major trade flows, providing important avenues for exports and imports for all three countries. The corridor features prominently in the significant trade relationship between Kazakhstan and PRC. The former accounts for 36.6% of total trade volume in XUAR, although this value has dropped 18% in 2014 due to the currency depreciation in Kazakhstan and the rising cost of rail transport.

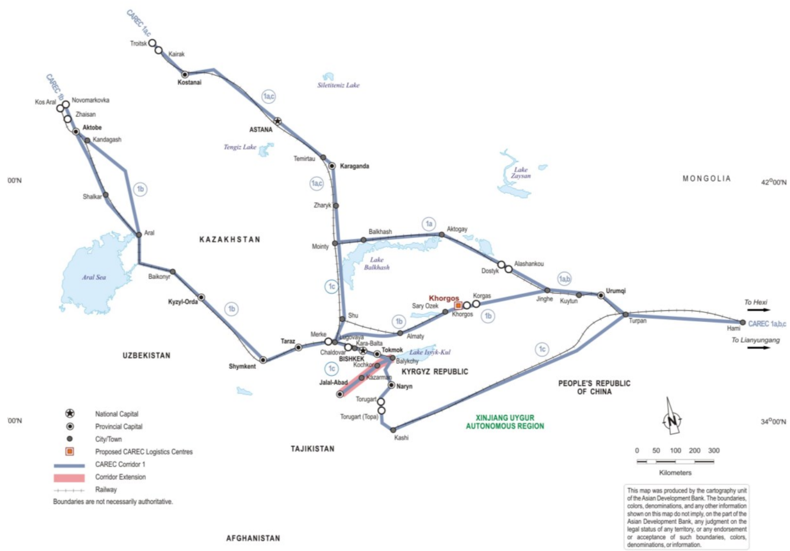
Road Transport

The speeds recorded in 2014 for Corridor 1 routes extended the same pattern observed in previous years. Corridor 1a allowed trucks to travel relatively fast. The trunk road linking Almaty and Astana is well paved. Trucks crossed mainly at Khorgos in 1b although a small number travelled via Alashankou-Dostyk. Kazakh-Russian BCPs were easy to cross.

The sharp reduction in speeds resulted in 1b having the fastest SWOD and lowest SWD. This 53% reduction in speed was attributed to the persistently lengthy time to cross the border at Khorgos. A positive development is the ongoing construction of the 'Western Europe – Western China' corridor. This entire route stretches 8,445 km, of which 2,787 km (33%) lies in Kazakhstan. The attention received and support given for this section which lies on Corridor 1b is evident. On 25 July 2014, Kazakhstan's Vice Minister of Transport and Communications said *"The Western Europe – Western China corridor will be fully equipped with road-side infrastructure"*. This is expected to enhance the attractiveness of Corridor 1b. With the completion of road construction, SWOD should improve from 2017.

Corridor 1c supports transit of cargoes between Kazakhstan-Kyrgyz Republic (through Karasuu-Ak Tilek) and PRC – Kyrgyz Republic (Torugart). It is a critical gateway for exports from PRC such as textile, food, and machinery to customers in Bishkek through 1c. The section from Torugart – Naryn –

Figure 10: CAREC Corridor 1



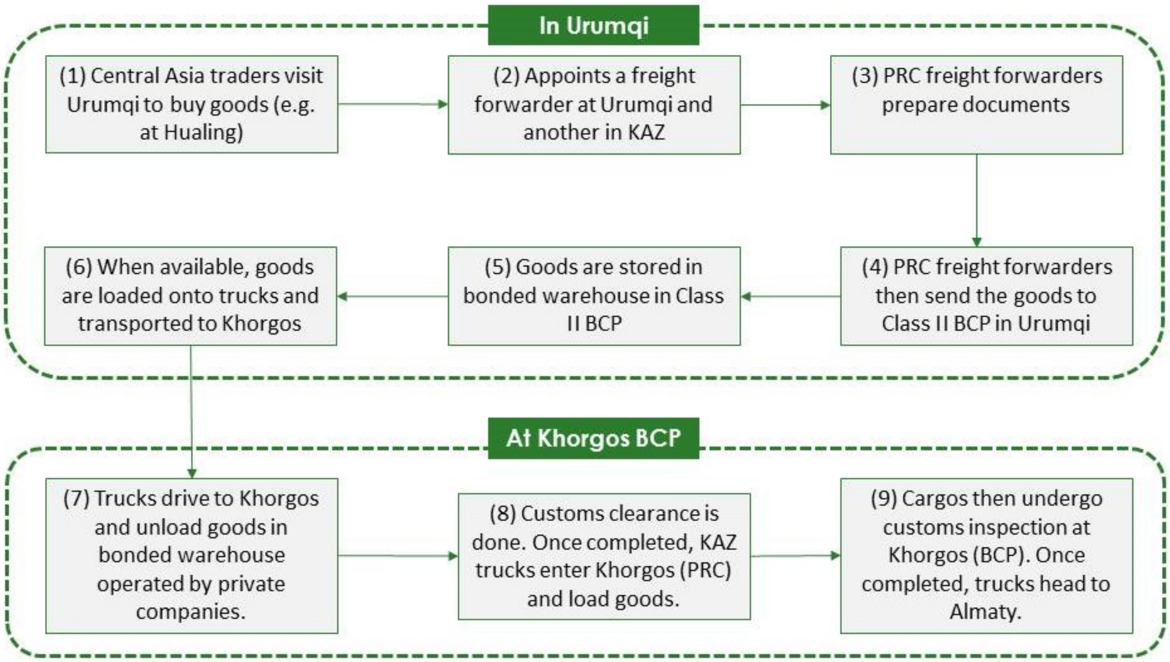
Bishkek is mountainous and driving in winter is dangerous. As such, SWOD has been consistently slower than 1a and 1b.

Border-crossing points and Bottlenecks

CAREC Corridor 1 is widely used to move exports from PRC into Central Asia. Road transport serves to move consumer goods and newly assembled vehicles from PRC to Kazakhstan and Kyrgyz Republic. By examining the supply chain of consumer goods (see Figure 11), one can understand the role of BCPs more effectively (in particular the problems associated with Khorgos BCP).

Central Asia buyers source from Urumqi, a major trading and transport hub in western PRC. Merchandise such as clothing, furniture, shoes, toys, and electrical appliances are purchased. The freight forwarder will then arrange for the goods to move to Class II storage centers. When trucks are available, the goods are then carried to Khorgos BCP. The distance from Urumqi to Khorgos is 665 km. The weight of the goods ranges from 21 to 35 tons. To reduce transport cost, the freight

Figure 11: Supply Chain of Goods of PRC Exports via Khorgos



forwarder arranges for an assortment of consumer goods to be carried in one truck.

In 2014, the average border crossing time for Khorgos (PRC) was 19.3 hours. For exports and trans-shipment cargoes bound for Almaty, Kazakh trucks enter the PRC Customs control zone to collect the goods. Then, they join in the queue to return to the Kazakh side. It is a common sight to see long queues of Kazakh trucks. Broadly speaking, the delays were due to:

The Need to Trans-Load

The distance from Urumqi to Almaty is only 1,046 km. In theory, if a truck can carry goods and travel directly to Almaty, the shipment can be completed within 1-2 days at a more efficient rate. However, cabotage rules prevent such practices. PRC-registered trucks are not easily permitted to enter Kazakhstan. Thus, this requires the goods to be stored in Class I and II storage centers before collection by Kazakh trucks. The need to store goods implies additional delay. Moreover, Class I storage costs are expensive. The cost to unload and reload the goods was shown to be in the range $300 to $400.

Little use of Containerization

Containers provide a good way to fulfil bonded carriage. However, in much of CAREC, containerization is not common on trucks. Transport economics make it inefficient to carry by containers. This is because the payload for a 40-foot container is about 12 to 15 tons (for consumer goods). However, using a conventional five axle delivery truck, it is possible to load 2.5 times more. CPMM data showed an average of 24 tons per truck. Although this enables a higher payload per trip, the downside is the longer handling and clearance times since such carriage is not considered 'bonded' and therefore Customs tend to exercise more caution in inspections.

Congestion

As the CAREC BCP registering the highest throughput of goods (by trucks), Khorgos is known to be severely congested during peak periods. This is due to an imbalance in available parking lots (the PRC side can hold 300 trucks but the Kazakh side can hold only 80 trucks). There are also no consolidation and deconsolidation facilities. In addition, traffic flow through the Customs control zone was not well conceived. If a truck has to exit the queue for examination, it is tough to maneuver in the tight space.

- **Documentation Errors**
  Clearance for a truck carrying only one or two products tends to be expeditious. However, due to the need to maximize truck load, each truck usually carries a huge assortment of consumer items. This increases the chance of inaccurately prepared customs declarations. Such documentation errors can result in lengthy delays as drivers need to contact the freight forwarder and corrective actions taken. Such occurrences can easily result in a delay of a few days.

- **Mismatch of operating hours**
  The operating hours of both BCPs are not synchronized. PRC time is two hours ahead of Almaty time. Standardized to PRC time zone, Khorgos (PRC) is open from 1030 to 2230, while Khorgos (KAZ) is open from 1130 to 1930 only with one hour lunch breaks at each BCP.

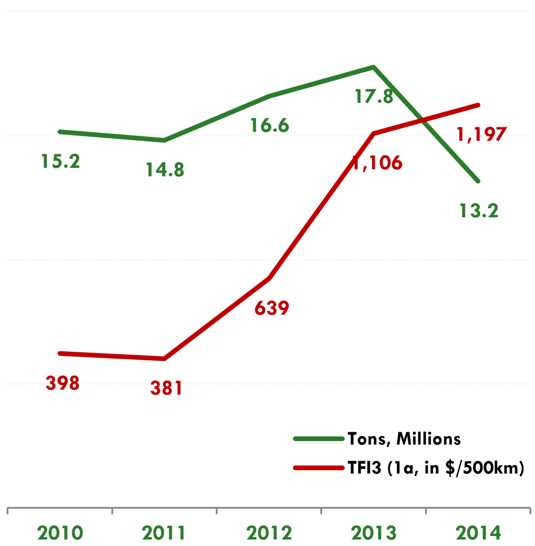
Development of the Khorgos ICBC (International Centre for Border Cooperation) promises to improve the border crossing. For instance, Kazakhstan has integrated logistics facilities in the master-plan. The Kazakh side will house 13 temporary storage centers, 8 packaging and processing facilities, and 3 refrigerated warehouses.

For Corridor 1c, there are no major problems reported for Torugart (PRC-KGZ) and Ak Tilek-Karasuu (KGZ-KAZ). Border crossing times appeared to be relatively short. The major constraint is the 600 km section from Torugart to Bishkek, which features particularly treacherous mountainous terrain. The lack of road-side services and high attitude make navigation dangerous, especially in cold winters.

Rail Transport

In Corridor 1, the Alashankou-Dostyk (PRC-KAZ) BCP plays a significant role. Alashankou is the only integrated BCP that handles cargoes transported by road, rail, and pipelines in PRC. Since it commenced operations in 1991, the annual

Figure 12: Volume of Cargo Handled at Alashankou vs Rail TFI3 (1a)



Source: Alashankou Inspection and Quarantine Bureau, Urumqi Customs

freight turnover at this location has been increasing dramatically. In 2014, total cargo turnover[6] stood at 25.4 million tons, a 14.8% decrease compared to 2013. This was the first time that Alashankou experienced a double digit percentage reduction since it became operational. This worrisome trend reflects a new reality that challenges the railway transportation business, and the greater economic picture.

Figure 12 illustrates two lines representing the annual cargo throughput (import and export) by rail processed at Alashankou against the TFI3 values (cost of shipping 20 tons of cargo a distance of 500 km) for sub-corridor 1a[7] over the past five years. The total cargo handled in 2010 was 15.5 million tons, representing the highest tonnage turnover in all Class I inland dry ports in PRC. The peak was achieved in 2013, where Alashankou handled a total turnover of 17.75 million tons. Surprisingly, the volume of goods turned down sharply in 2014, dropping to 13.16 million tons. This represented a 26% contraction year-on-year. This is the first time where such a double digit percentage contraction was observed in Alashankou.

What caused the contraction? To answer this question, the addition of the second line in the same chart proves to be useful. CPMM has four development effectiveness indicators. CPMM provides these Trade Facilitation Indicators (TFIs) as

6 Total cargo turnover was measured by the total tonnage transported through road, rail, and pipelines for import, transit, and export.

7 The TFI3 for 1a is chosen because Alashankou-Dostyk (PRC-KAZ) lies along this sub-corridor. Thus, the samples in 1a will most accurately reflect the actual rail tariffs.

inputs to the CAREC Development Effectiveness Review. TFI3 is the cost of a shipment carrying 20 tons a distance of 500 km. As each CAREC Corridor has different lengths and each shipment carries varying tons, the units of 20 tons and 500 km are selected so that comparisons are meaningful. From the same time period 2010 to 2014, TFI3 for 1a has been gradually increasing, with a surge observed in 2012 to 2014. It seems to indicate the limiting effect of higher transport cost on the trade flows. As railways become more expensive, shippers have to consider alternative modes of transport, or even scale back exports as margins are eroded.

There is also another explanation. From a macro-economic perspective, PRC's economy has been slowing since 2012. The drop in aggregate demand results in reduced need for importing raw materials for industries. Alashankou is an 'import-oriented' dry port that receives energy products and minerals, mainly destined for industrial uses. As PRC's economy slows, the imports naturally reduce. In addition, Kazakhstan's tenge depreciated sharply in 2014,[8] driving down demand for imports as well since they become more expensive.

Thus, it would seem that the factors prompting a drop in annual tonnage handled by rail across Alashankou are threefold. Macro-economic environment resulted in a drop in aggregate demand, thus creating head-winds for the export of raw materials to PRC from Kazakhstan. Oh the other hand, the lower value of KZT also depressed the buying power of Kazakh consumers. The next factor is the rising cost of railways. Freight forwarders from both PRC and Kazakhstan have been expounding on this fact since 2013.

Among rail activities listed in Table 3, a major delay in Corridor 1 is restriction on entry taking 36.8 hours. Re-loading activities consumed 30.3 hours, followed by prioritization of train movement (21.8 hours). Wagon dispatch took 15.7 hours, followed by 9.2 hours of delay caused by faulty cargo-handling equipment. Also note that phyto-sanitary activities averaged 48 hours but are rarely encountered to contribute overall delay at the borders.

Border-crossing points and Bottlenecks

CPMM results from 2012 to 2014 showed that average border crossing times at Alashankou and Dostyk have come down. Dostyk exhibited the longest border crossing time (close to 60 hours). The principal causes were (i) Long waiting time for re-loading, (ii) No wagons available, and (iii) marshalling. These causes can be addressed in part by increasing the capacity of this station.

Alashankou border crossing times averaged 42.4 hours in 2014. Efforts have been put in place to improve four trans-loading terminals. The findings suggested that the delays in Alashankou were not all capacity-related, but were affected by the congestion in Dostyk. Restriction on entry and waiting for priority trains were some often cited reasons. This was also similar to findings in previous annual reports.

Khorgos and Altynkol were included in the latest CPMM: the average border crossing times were 24 hours and 37 hours, respectively. This would indicate that trains crossing the border at Khorgos-Altynkol are processed relatively more expeditiously. Indeed, the improvements seen in Alashankou-Dostyk could also be partly attributed to the alternative stations at Khorgos to handle rail traffic. However, astute readers would observe there was a substantial difference between SWOD and SWD for Corridor 1b (through this BCP pair). Thus, there is scope for further improvement of the average border crossing time at Khorgos-Altynkol.

8 The Kazakhstan Tenge (KZT) devalued from an average of 150 to 180 per USD in 2014.

C2 Corridor 2

Mediterranean–East Asia

Figure 13: CAREC Corridor 2

Corridor 2 is an extensive corridor that passes through eight CAREC member countries (except Mongolia and Pakistan). It is a multi-modal corridor featuring roads (9,900 km) and railways (9,700 km), and one of the two corridors[9] that support maritime transport across the Caspian Sea. In 2014, two new sub-corridors were added. Corridor 2c is a railway route linking east and west Kazakhstan. This corridor serves the movements of energy products and minerals, from west (e.g. Aktau region) to east (Alashankou), which are then exported to PRC. Corridor 2d extends southwards, linking PRC to Afghanistan through Kyrgyz Republic and Tajikistan. Due to the absence of a rail option along 2d, this route is used mainly by trucks for carriage of goods.

Road Transport

For all quarters in 2014, Corridor 2 ranked as the fastest corridor using SWOD. Based on annualized data, it is ranked first in terms of SWOD for 2014, continuing the achievement in 2013 when it ranked with Corridor 1 as the fastest. Average SWOD was 49 kph, while SWD dropped to 24 kph, ranked third after Corridors 3 and 6.

A primary reason for the high SWOD was the heavy use of Corridor 2 by Uzbek drivers. The road surface in Turkmenistan and Uzbekistan is relatively good, thus higher driving speeds were recorded. Uzbek drivers moved fruits and vegetables as well as yarn and cotton from the Fergana Valley to foreign export destinations. On the other hand, industrial and consumer goods came into Uzbekistan from Iran and Russia via Corridor 2.

Border-crossing points and Bottlenecks

The major bottlenecks in Corridor 2 were:

Alat-Farap (UZB-TKM)

Average border crossing time was 12 hours in either direction. Consumer goods in 40-foot containers from Iran and Turkey were sent to Uzbekistan, while yarn and cotton stuffed in return containers were sent to the seaports.

Yierkeshitan-Irkeshtan (PRC-KGZ)

Formerly a busy BCP, the number of samples has dwindled significantly in 2014. PRC exports to Bishkek using Torugart, so Irkeshtan is only used for exceptional transit shipments to Tajikistan and beyond. Since Karamyk is closed to transit traffic, truck carriers have diverted to Kulma Pass which has proven to be cheaper than crossing via Batken.

Karasuu-Kulma (PRC-TAJ)

This BCP is fast emerging as a popular one and replacing the role played by Irkeshtan. Border crossing time varies substantially depending on the driver and the truck registration. For a Tajik operator, the waiting time at Karasuu can be long (15-20 hours). The drive will undergo the typical CIQ activities at Karasuu. After crossing Kulma, the stoppage time is quite minimal. For drivers from PRC, the border crossing at Karasuu-Kulma appeared to be short. The driver needs to go through border security

9 The other is Corridor 6, which also features the Trans-Caspian segment. .
10 CIQ is Customs, Inspection and Quarantine.

check, customs declaration, immigration and weight certification. This can be completed in 2 hours. The same is repeated in Kulma. However, operators from PRC tend to spend longer time waiting at Murgab and Khorog (10-20 hours each) for customs-escort (typically, trucks registered in PRC do not travel under cover of a TIR Carnet and thus would require customs-escort. This, however, may change at some point in 2015 as PRC considers the merits of acceding to the TIR Convention.) The trucks move in convoys, so the waiting time can be rather long.

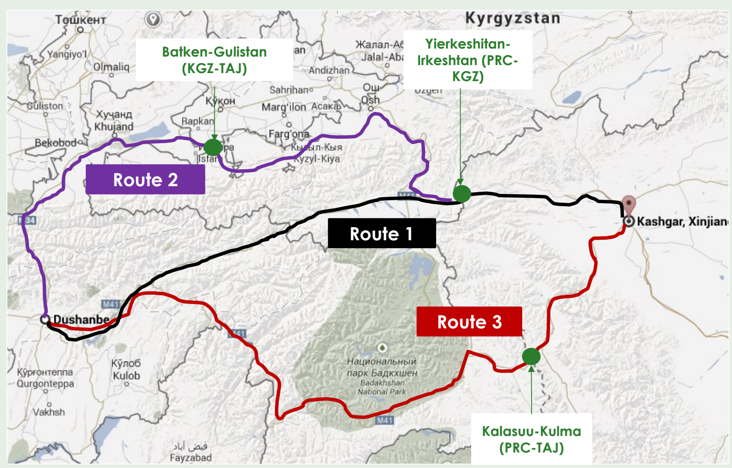
Rail Transport

A new element in Corridor 2 is the inclusion of a new railway line connecting Zhezkazghan to Beyneu in 2c. This link is expected to shorten the distance connecting Central and West Kazakhstan, facilitating new transit potential. The significance of this railway is to support the Silk Wind Container Block Train services connecting PRC to Turkey. With the completion of the Bosporus Tunnel, the corridor can facilitate movement of goods to Europe as the final destination. Concurrently, Turkmenbashi seaport is being modernized and a new logistics center will be constructed. Currently CPMM has not commenced collection of data along 2c.

Box 1: Karamyk – To Open or Not?

Corridor 2 can unleash greater potential for intra-regional trade if Karamyk is open to third-party traffic. Karamyk is a BCP designated by the Kyrgyz Republic Border Guard Service in 2007 to serve only bilateral traffic between Kyrgyz Republic and Tajikistan. Thus, it is not open to trucks bound for a third destination, nor can goods originating in a third country transit this BCP. However the strategic location of this BCP would greatly lower the cost of international traffic if it is allowed to serve third-party traffic. Tajikistan has classified its facilities serving this BCP as enjoying international status, but the Kyrgyz Republic has not reciprocated.

According to data from Urumqi Customs, trade between XUAR and Tajikistan has expanded rapidly, reaching $2 billion (+26% year on year) in 2014. Before 2012, many Chinese and Tajik trucks operated from Kashi-Karamyk-Dushanbe (Route 1), since the bilateral status was enforced only sporadically. Since the closure of Karamyk to third-country traffic toward the end of 2012, trucks are diverted to cross at Batken (Route 2), a lengthier, more time-consuming route. In 2013, Kulma Pass (Route 3) became operational in winter to serve the traffic, allowing a direct connection between PRC and Tajikistan. The terrain is mountainous and heavy snow can compel trucks to travel at a speed of only 25 kph, but the road is still passable. Based on CPMM data collected from 2012 to 2014, the table compared the efficiency of each route.



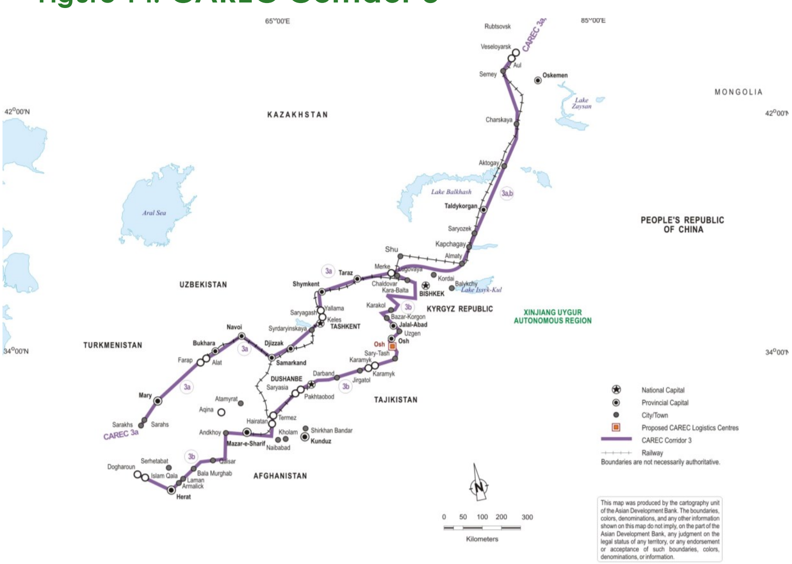
	Distance	Time	Cost
	km	hr	$
Route 1: Via Karamyk	877	80	5,250
Route 2: Via Batken	1,198	105	7,160
Route 3: Via Kulma Pass	1,307	121	6,475

Due to the shortest distance, Route 1 is the fastest and least costly. Since Karamyk is not open to transit traffic, shippers have to choose between Route 2 or 3. Each has its own merits. Route 2 is faster but it costs more, compared to Route 3. Although there are two border crossings in Route 2, the total time is still shorter. This is because of the mountainous terrain and the poor state of the uneven road surface along Route 3. This naturally acts as a speed limit to each truck travelling along Route 3. Thus, the need to drive slowly and longer distance results in additional one or two days traversing Route 3. Despite the longer lead time, shippers are increasingly using this route due to the relatively sizeable cost savings.

C3 Corridor 3

Russian Federation–Middle East and South Asia

Figure 14: CAREC Corridor 3



This north-south axle provides a passageway for Russia to trade with markets in the Middle East and South Asia. In particular, Afghanistan, Kyrgyz Republic, Tajikistan, and Uzbekistan have valuable roles as transit countries. This corridor has 6,900 km of roads and 4,800 km of railways. Transit trade is not optimized now due to various reasons. Perceived insecurity in Afghanistan, the limitation on the role of Karamyk for transit traffic, the mountainous terrain in Tajikistan, and the restrictive policies in Uzbekistan mean that Corridor 3 has yet to realize its full potential for transit trade.

Road Transport

Corridor 3 ranked as the second fastest corridor in 2014, attaining SWOD of 49 kph. SWD was ranked first at 27 kph. However, trucks at different sections could experience varying speeds. By examining the TFIs for 3a and 3b, some conclusions can be made (Figure 15).

First, the average border crossing time (TFI1) for 3a is consistently longer than that in 3b from 2010 to 2014. However, this did not translate into faster speed for 3b. In fact, the TFI4 (SWD) for 3b is usually lower than that of 3a. The implication is thus clear. While border crossing might take longer in 3a, trucks can move faster when travelling, compensating somewhat for the longer border crossing time. Kyrgyz and Tajik drivers validated this and reported slower navigation across 3b, especially in winter.

Second, the cost of using 3a and 3b is analyzed. Over the past five years, 3b had a lower average border crossing cost (TFI2), but this unfortunately did not translate into an advantageous overall cost. In fact, the overall cost of shipping 20 tons of cargo over 500 km (TFI3) on 3b was four times higher than 3a in 2013 and 2014. This implied a very high vehicle operating cost that was attributed to the high trucking cost in Tajikistan.

In conclusion, CPMM analysis suggests that, while 3a suffered a longer border crossing time and a more costly effort, the total cost concept indicated that 3b was less efficient. Would this suggest a trade diversion from 3b to 3a? This did not happen as restrictive policies and the customs regime in Uzbekistan discouraged it. For instance, shipping radio equipment for commercial use might require a permit from the Ministry of Defense, since the item could be classified as having some sort of 'military application'. Carriers reflected that while shipping across Tajikistan is more physically challenging, the rules and regulations were simpler. This again points to the impact of non-physical barriers that greatly reduce the transit potential of a corridor.

Border-crossing points and Bottlenecks

The major bottlenecks in Corridor 3 were:

Sarakhs-Sarahs (IRN-UZB)

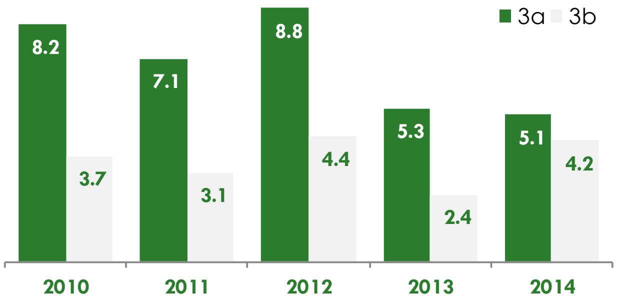
Average border crossing time was 14 hours in either direction. Heavily used by Uzbek carriers for moving imports and exports. Bandar Abbas seaport is the key gateway. Due to the high volume of traffic, trucks had to spend 40% of the lead time waiting in queue.

Alat-Farap (UZB-TKM)

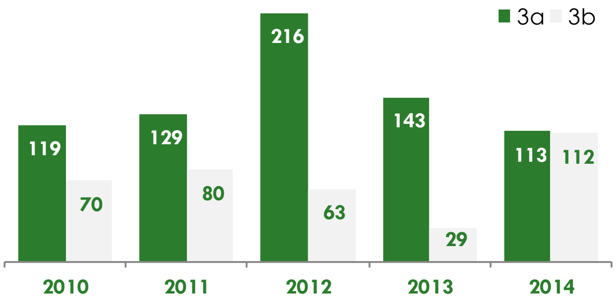
Average border crossing time was 12 hours in either direction. Consumer goods in 40-foot containers from Iran

Figure 15: Corridor 3 Trade Facilitation Indicators

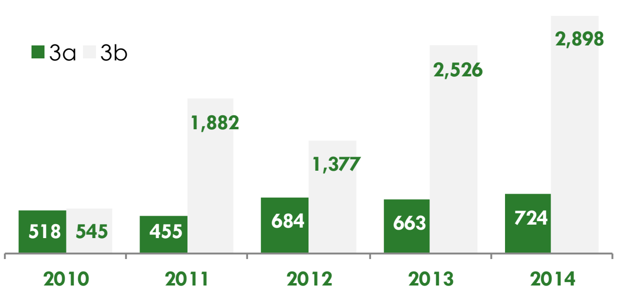
TFI1: Time taken to clear a border crossing point, hr



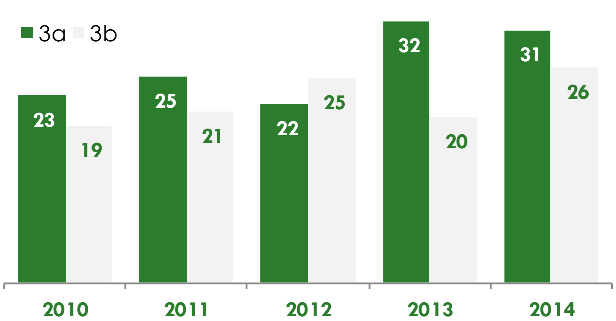
TFI2: Cost incurred at border crossing clearance, $



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



TFI4: Speed to travel on CAREC Corridors, kph



Box 2: Transit Potential of Corridor 3 in Shipment of Agricultural Products

The movement of agricultural products is a core activity since many CAREC member countries are net exporters of fruits and vegetables. An exception is Kazakhstan. Although Kazakhstan is the seventh largest wheat exporter (wheat exports accounts for 77% of total agriculture exports in Kazakhstan), the country's production of fruits and vegetables can only meet 30% of the domestic demand.

Kazakhstan now imports fruits and vegetables from Kyrgyz Republic and Uzbekistan. However, in the supply chain of agricultural products, the shipper must be aware of 'in-season' and 'off season' periods. During 'in-season', supply is bountiful due to harvest. During 'off-season', supply is limited. This is aggravated by the lack of cold chain facilities that could have extended the shelf life of perishables. Due to proximity and similar climate, the 'in' and 'off' seasons for fruits and vegetables are similar across Kazakhstan, Kyrgyz Republic, and Uzbekistan. Thus, in 'off season', Kazakhstan may even have to import apples from faraway places like Poland. This results in higher cost due to increased transportation cost.

One solution to lower supply chain cost and stabilize supply continuity is to consider sourcing from nearby countries with different seasonal patterns. Afghanistan and Pakistan for instance, produce many agricultural products now. Yet the products are not exported to meet demand in Kazakhstan. This trade pattern is reflected in the broader trade volume between Central and South Asia. Although these two regions are very near to each other, trade volume has been disappointingly low. This is explained by the perceived insecure situation in South Asia, lack of transit trade agreements, and differences in standards. For instance, the axle load limit in Central Asia is generally 10 tons per axle, but this can be higher in South Asia.

More transit trade can move along Corridor 3. However, the following actions would be instrumental:

- **Lower the trucking cost**
  Currently trucking cost is too high. Within Tajikistan, it would cost $3,000 for a truck to move from Karamyk to Nizhni Panj.
- **Opening of Karamyk**
  As argued in Corridor 2 analysis, Karamyk is the shortest route for transit traffic. This BCP should open to transit traffic.
- **Harmonizing Phyto-Sanitary Standards**
  The expeditious movement of agricultural products requires harmonization of phyto-sanitary standards. Unharmonized standards invite repeated and duplicate laboratory inspections and tests.

and Turkey were sent to Uzbekistan, while yarn and cotton stuffed in return containers were sent to the seaports.

Yallama-Konysbaeva (UZB-KAZ)

A busy BCP where agricultural products are sent from Urgut, Samarkand, or Bukhara to Almaty. Average border crossing time was 14 hours.

Aul-Veseloyarsk (KAZ-RUS)

Since the formation of the Eurasian Economic Union, this BCP has become rather efficient. However in 2014, some Kyrgyz drivers reported longer than normal time in clearing the BCP. The truck was detained due to the 'invalidity' of the TIR Carnet, which was linked to the TIR Crisis in Russia. Some unfortunate drivers had to pay close to $1,000 to pass the Customs. Although this was recorded, other Kyrgyz drivers did not encounter this problem. CPMM will continue to monitor this situation and determine if the problem has ceased in 2015.

Rail Transport

In 2014, there was no rail traffic data collected along Corridor 3. Efforts are being made in 2015 to cover this corridor.

Corridor 3 has important implications for shippers, in particular for South Asian exporters who like to access Central Asian and Russian markets. As explained above, shippers in South Asia have two options to ship exports such as agricultural products, which have good demand in northern parts of Kazakhstan and Russia. The shipper can send by 3a or 3b. The latter is a costly route and therefore not likely to be competitive. However, sending items by trucks over 3a through Uzbekistan is challenging due to restrictions on transit goods.

If CAREC railways provided a viable option for shipping perishables along 3a, then the supply chain could become more efficient. For example, Afghan fruits and vegetables could be loaded onto trains at Mazar-e-Sharif, and then enter Uzbekistan at Termez before heading to Kazakhstan and Russia. This could increase the transit traffic for railways in Uzbekistan, and also help to address the problem of empty railways from Hairatan to Termez. For reasons unknown, the Uzbekistan Railways operator does not permit Afghan exports to be loaded on trains for the return trip, thus forcing Afghan exporters to use barge transfer for moving their exports.

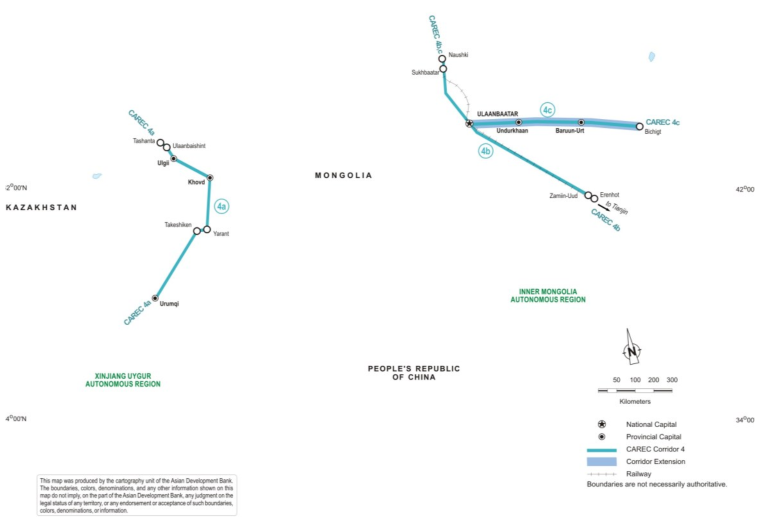
In conclusion, Corridor 3 has rich potential as a transit corridor. Both trucks and trains can carry more transit traffic, but the current situation is replete with factors that, in practice, limit the corridor's potential.

C4 Corridor 4

Russia–East Asia

Mongolia is one of the most sparsely populated countries in the world. Being a vast land-locked land mass (1.5 million km^2), the low road and rail density per km^2 limits the movement of cargoes. Ulaanbaatar is the transport hub, serving transit trade between PRC and Russia. Corridor 4b is the major transport route for exports, imports, and transit traffic. In 2014, CPMM data collection commenced for the new sub-corridor 4c which passes through Bichigt-Zunn Khatavch (MON-PRC). Corridor 4 has 2,400 km of roads and 1,100 km of railways.

Figure 16: CAREC Corridor 4



Road Transport

A major improvement was the completion of the road section linking Zamyn Uud and Choyr. This project, financed by the Asian Development Bank, produced a 432 km two lane carriageway paved with asphalt concrete. The recent completion of this road in 2014 has brought about immediate improvements.

Figure 17: Completion of road connecting Zamyn Uud to Choyr in 4b

Based on CPMM data, there were marked improvements in the cost and speed of trucks moving along 4b from 2013 to 2014.

Using TFI3, which measures the transport cost of a 20 ton shipment over 500km, the cost of road transport has lowered from $1,437 to $1,200 (-16.45%). Speed has also increased. SWOD is used, which does not include stoppage time, since the objective here is to assess whether the new road with better paved surface increases the travelling speed. From 2013 to 2014, SWOD rose from 24 kph to 36 kph (a 50% increase). .

Anecdotal evidence also supports the contribution of this new road. The new road not only reduced transport cost, but more importantly offers new multi-modal opportunities for shippers. It is now possible for shippers to consider a rail-road option when importing goods from PRC. For instance, shippers shared that, in the past, used automobiles were shipped using 40-foot containers on railways. Containerization is an expensive option because only four vehicles can be put inside a container, and much of the compartment space is not utilized. The new road makes it possible for the shipper to arrange drivers at Zamyn Uud. After customs clearance, the used cars are driven out from the containers and move along the new road to Ulaanbaatar. This saves the shippers time and money.

The new sub-corridor 4c showed movement of industrial materials and oil from PRC to Mongolia. CPMM studies focused on the section Zunn Khatavch-Bichigt (PRC-MON). The truck then moves through Sukhbaatar-Ulaanbaatar. The entire distance is 842 km, taking 25 hours to complete and costing approximately $2,500 for one truck. Goods are in containerized form.

Border-crossing points and Bottlenecks

The major bottlenecks in Corridor 4 were:

- **Erenhot-Zamyn Uud (PRC-MON)**
  This BCP is one of the most time-consuming of all CAREC corridors BCPs. Border crossing time averaged 24 hours. A primary cause is the build-up of traffic on the PRC side of the border due to the limited operating hours of the BCP. This BCP is the only major BCP for PRC-Mongolia trade, yet operates only 10 hours per day (8am – 6pm). Other contributing factors are the time consumed in Erenhot trans-loading cargo from PRC- to Mongolian-registered vehicles and the lengthy process of ensuring that all required documentation is in order once trucks enter Mongolia. While there are other smaller BCPs such as Ganqimaodu-Gashunn Sukhait (PRC-MON), those BCPs have very limited capacity and do not have laboratories to handle phyto-sanitary inspections or dangerous goods.

  Understanding these constraints, Asian Development Bank is financing the construction of a multi-modal logistics center at Zamyn Uud, complete with customs, quarantine, and phyto-sanitary facilities to expand the capacity. This would also facilitate transshipment and multi-modal mode (road-road and road-rail). The center is expected to be completed by 2016.

- **Zuun Khatavch-Bichigt (PRC-MON)**
  Average border crossing time was 3 hours. The main delay was to undergo customs clearance at Bichigt. The normal border crossing fee of $60 per truck plus 15.5% of the commercial invoice value applies. Along the way, the truck also has to pay a small road toll ranging from $2 to $5 at the major checkpoints. The data thus far suggest that the border crossing time here is much shorter than that experienced at Erenhot-Zamyn Uud.

Figure 18: A worker in Zamyn Uud rail terminal conducting technical inspection.

At Khiagt-Altanbulag (RUS-MON), no significant problems were observed. Border crossing could be completed in 1-2 hours.

Rail Transport

In 2014, CPMM railway data studies focused on collecting data on three routes along 4b:

- **Trains from Tianjin to Ulaanbaatar**
  The total journey is 1,692 km and the train crosses Erenhot-Zamyn Uud (PRC-MON). Cargoes are sent in 20-foot or 40-foot containers, carrying goods manufactured in PRC.

- **Trains from Ulaanbaatar to Tianjin**
  These are Mongolian exports to PRC. The product composition of cargo transported on this route has changed significantly. In the past, copper or zinc concentrates were sent. In 2014, the samples did not contain such commodities. Instead, the containers are used to consolidate loose cargoes and then sent to PRC. This reflected the declining demand from PRC for raw materials.

- **Trains from Russia to China**
  Russian timber is sent to PRC in conventional rail wagons (60 tons capacity) along corridor 4. This is an example of transship cargo on railways.

In 2014, sub-corridor 4b achieved SWOD of 22 kph and SWD of 8 kph for trains. Using the new CPMM methodology, it is now possible to dissect the reasons for delays (see Table 3).

Restriction on entry emerged as the most time-consuming delay on average, taking 36.2 hours. This pattern echoed the findings in Corridor 1, where the same reason was cited as most time-consuming. The unavailability of wagons was discovered to be the second most time-consuming reason, averaging 23.1 hours of delay. Thirdly, trans-loading due to the break in gauge at Erenhot-Zamyn Uud took 18.5 hours. Re-loading in terminal took 14.1 hours and correcting documentation errors averaged 12 hours.

Border-crossing points and Bottlenecks

The major bottlenecks in Corridor 4 were:

- **Erenhot-Zamyn Uud (PRC-MON)**

  In each annual report, this BCP is identified as very time-consuming. For a train moving from PRC to Mongolia, the average delay at Erenhot and Zamyn Uud were 30.7 hours and 23.7 hours, respectively. For a train moving the opposite direction, the delays averaged 44.4 hours and 3.1 hours, respectively.

  The Mongolian railway operator long appreciated the capacity constraints in Zamyn Uud. The authorities are actively exploring solutions to expand railway capacity on sub-corridor 4b. Electrification of tracks, double-stack train technology, and increasing the number of movable cranes have been explored, all which requires extensive capital. Zamyn Uud would also become a new integrated multi-modal hub.

- **Naushki-Sukhbaatar (RUS-MON)**

  Not as time-consuming as Erenhot-Zamyn Uud, border crossing here is still lengthy in duration. For trains bound to Mongolia, average duration at Naushki was 11.5 hours and Sukhbaatar was 15 hours.

C5 Corridor 5

Europe–East Asia–Middle East and South Asia

Figure 19: **CAREC Corridor 5**

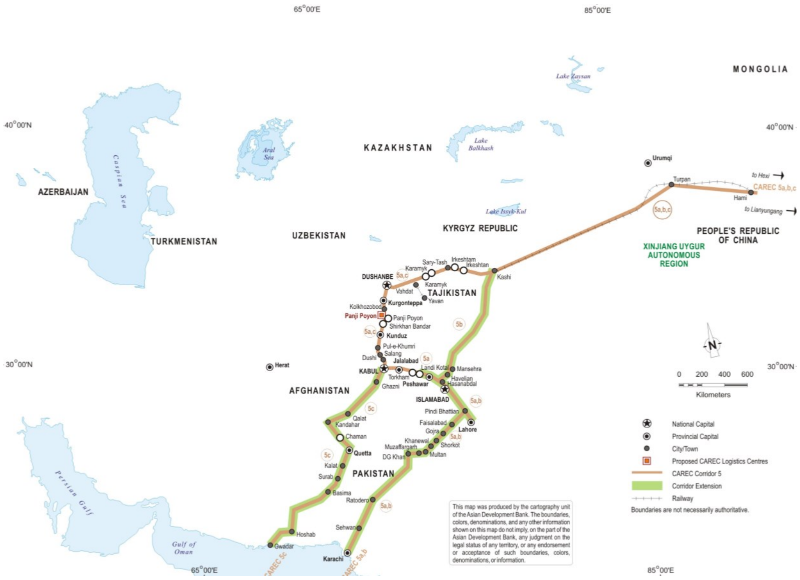


Table 8: **Corridor 5 TFIs, 2014**

		Mean	Rank	Remark
TFI1	Time taken to clear a border crossing point (hr)	28.9	1	Most lengthy
TFI2	Cost incurred at border crossing clearance (US$)	171	2	Costly
TFI3	Cost incurred to travel a corridor section (per 500km, per 20-ton	2,050	2	Costly
TFI4	Speed to travel on CAREC Corridors (kph)	17	6	Slowest
SWOD	Speed without delay (kph)	36	6	Slowest

This corridor features 3,700 km of roads and 2,000 km of railways. Yet the potential of railways is not optimized because only the Turpan-Kashi section is operational. From Kashi, goods have to be trans-loaded to trucks for the remaining journey. While Pakistan has railways linking Karachi to Islamabad, this is by and large a passenger service. Only an estimated 2% of Pakistan's railway capacity is used for freight. Hence, CPMM focuses on collecting road transport data for Corridor 5 due to the under-developed state of rail transport for freight.

Road Transport

Corridor 5 continues to be the most challenged CAREC corridor. Since 2010, corridor TFIs show it to be the most time-consuming and costly. In 2014, Corridor 5 performance continued to suffer (see Table 8).

Corridor 5 has strategic importance but its value as a transit corridor is not realized. Recognizing this, CAREC has worked hard to make this corridor more effective, such as facilitating the Cross Border Transport Agreement (CBTA) between Afghanistan, Kyrgyz Republic, and Tajikistan.

To enhance its effectiveness further, the following initiatives can be considered.

Quadrilateral Agreement on Traffic in Transit (QATT)

This is a multi-lateral agreement signed in 1996 between four countries (Kazakhstan, Kyrgyz Republic, Pakistan, and PRC). On the map, it facilitates the shortest distance for Kazakh, Kyrgyz, and PRC drivers to reach Karachi seaport using CAREC sub-corridor 5b. This is the Karakorum Highway. From Bishkek to Karachi, the distance is 3,200km. A truck carrying 20 tons will take 9-11 days to complete the journey, and cost $8,500. This translates to $1,328 per 500 km.[11] This cost is actually below the current TFI3 for Corridor 5 ($2,050).

There are impediments to sub-corridor 5b, both natural and man-made. The Karakorum Highway has a high elevation which can exceed 5,000m above sea level. The BCP Khunjerab-Sost (PRC-PAK) is not designed to handle large volumes of traffic. It is also not passable in winter. Furthermore, a system of unified seals is required between the four countries and BCP officers are not familiar with this agreement.

Regional Mechanism to Issue Road Pass and Driver's Visa

Due to distinct historical and cultural developments, Central

11 The cost and time estimates are provided by freight forwarders in Pakistan. Currently CPMM does not collect data on Corridor 5b due to the scarcity of shipments.

and South Asia have very different certifications and standards. One common problem in Corridor 5 is the need to trans-load vehicles.

In theory, if a shipment from Kashi in PRC needs to go to Karachi in Pakistan, the most likely route to use is 5a. However, there will be at least three trans-loadings required, each of which incurs cost and increases the chance of damage to the goods being moved from one vehicle or container to the next. Kyrgyz drivers will collect the shipment at Kashi, cross the border at Irkeshtan, and then move to Shirkhan Bandar. The goods are then trans-loaded onto an Afghanistan-registered truck which then continues to Peshawar. There, the goods are trans-loaded onto a Pakistan-registered truck bound for Karachi as the final destination. The number of trans-loading operations can vary depending on the bilateral or trilateral agreements signed between the countries. Nonetheless, trucks within Central Asia can travel relatively more easily across borders. However, for an Afghanistan, PRC, or Pakistan operator to enter Central Asia, there are many impediments.

A core problem is the restriction presented by road pass and visa requirements. A road pass is required for a foreign truck to enter a country. The availability of road passes is subject to a country-based quota system. For Afghanistan, it is virtually impossible for common operators to obtain a road pass due to the perceived security situation. Drivers from Pakistan, PRC, and Afghanistan also find it harder to obtain visa, especially Afghanistan nationals. For drivers from these countries, it is not simply a matter of visiting the nearest consulate to obtain a multiple entry visa. They have to apply for such support at the embassy of the transit country in their respective capital cities (i.e., a driver from Kashi must travel to Beijing).

Without an effective mechanism to simplify the issuance of road passes and visas, it will be hard to facilitate trade between East Asia, Central Asia, and South Asia, which is the core purpose of Corridor 5.

Border-crossing points and Bottlenecks

The major bottlenecks in Corridor 5 are:

- **Peshawar-Torkham (PAK-AFG)**

  This is one of the most cumbersome BCPs to complete border crossing. Due to the import-reliant trade structure of Afghanistan, all samples are shipments from Karachi going to Kabul through this BCP. Trucks passing Peshawar took 34 hours, primarily due to lengthy customs formalities. At Torkham, the average border crossing time took 39.5 hours, also due to customs controls. Waiting time could be long and erratic as well.

  It must be highlighted that trucks also face delays and incur additional costs outside of the BCP. First, all trucks heading to Afghanistan have to form a convoy at D.I. Khan. Second, between Peshawar to Torkham, there are many police checkpoints. All these activities delay the journey and are potential areas for unofficial payments.

- **Chaman-Spin Buldak (PAK-AFG)**

  This is another bottleneck detected in Corridor 5. Average border crossing time at Chaman was 36 hours, while it averaged 60 hours at Spin Buldak. Customs controls and waiting time were the main contributing factors. Trucks queue up at Quetta and move in convoy, escorted by security.

- **Nizhni Panj-Shirkhan Bandar (TAJ-AFG)**

  This node previously served movement of ISAF cargoes from Manas in Kyrgyz Republic to Afghanistan, and recently the reverse movement where cargoes are returned to Manas due to the ISAF withdrawal. Carriers enjoyed brisk business until 2013, when business volume declined. In 2014, business conditions became very challenging for carriers serving the ISAF. Drivers were either fired or had to compete at very low prices. In the long term, liberalized trade between Central and South Asia can benefit the transport sector and offer a sustainable business environment.

  For trains inbound Afghanistan, time to cross Nizhni Panj averaged 4.5 hours. Longer time was needed to cross Shirkhan Bandar, at 10.5 hours. A major reason is the need to trans-load cargoes between trucks. The lack of material handling equipment such as forklifts hampered the efficiency of this process. Waiting time was another cause for the delay. It is possible to reduce the border crossing time here. First, TIR was re-activated in Afghanistan in September 2013. If the number of TIR Carnet Holders can be increased in Afghanistan, this can obviate the need for trans-load because Afghan trucks might then enter Tajikistan under a TIR consignment, which simplifies border crossing due to the use of secure vehicles and mutual recognition of Customs controls.

- **Yierkeshitan-Irkeshtan (PRC-KGZ)**

  This BCP was regarded previously as a time-consuming BCP. The situation has improved as a result of reduced traffic prompted by the closure of Karamyk (KGZ) to third-country goods and vehicles. A possible explanation is the diversion of trade from this location to Karasuu-Kulma (PRC-TAJ) for transit cargoes. Trucks carrying exports from PRC to Osh still cross at Irkeshtan, but transit shipments to Tajikistan or Afghanistan now move to cross at Karasuu -Kulma due to the lower transport cost explained earlier.

C6 Corridor 6

Europe–Middle East and South Asia

In Corridor 6, Central Asia offers transit routes to connect Europe with the Middle East and South Asia. This corridor features 10,600 km of roads and 7,200 km of railways. However, railway coverage is effective mainly in the northern regions which are operated by Kazakhstan and Uzbekistan. Cargoes in the south are still transported by trucks due to the absence of a railway network in Afghanistan, the focus on passenger service in Pakistan, and the need to extend railway sections in Turkmenistan.

Road Transport

In 2014, trucks using Corridor 6 traveled at a SWOD of 46 kph (ranked third) and SWD of 25 kph (ranked second). This is consistent with speeds observed in previous years.

To analyze the efficiency of each sub-corridor, the four trade facilitation indicators are compared. The following charts illustrate the patterns.

Over a five year period (2010 to 2014), average border crossing times have fluctuated. In 2013-2014, this time has stabilized for 6a and 6b. A surge was seen in 6c, in which the average border crossing time doubled from 6 hours to 12 hours. This was due to the inclusion of Karachi-Kabul samples which include the BCP Peshawar-Torkham (PAK-AFG). This BCP is challenging and tends to be one of the most time-consuming.

Two observations are made when analyzing the SWDs. Generally, average speeds appear to be increasing gradually from 2010 to 2014. Secondly, the patterns in 2013 and 2014 were similar. Corridor 6b had the slowest speed while higher speeds were attained in 6a and 6c.

Border crossing costs have also presented a consistent pattern between 2013 to 2014. 6b continued to be more expensive while 6a remained as least costly.

A comparison of border crossing times and costs reveals that 6c appeared to be the most time-consuming and costly route.

Figure 20: CAREC Corridor 6

The high costs were driven by customs controls, loading and unloading, and road tolls. Trucks moving across Afghanistan and Pakistan tend to pay higher costs under these activities.

Border-crossing points and Bottlenecks

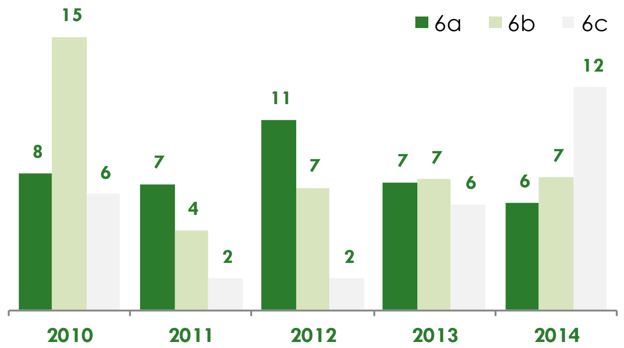
The major bottlenecks in Corridor 6 were:

- **Yallama-Konysbaeva (UZB-KAZ)**
  Border crossing times of shipments bound to Kazakhstan at Yallama and Konysbaeva averaged 6.4 hours and 7.5 hours, respectively. Samples collected reflect the shipment of agricultural products from Uzbekistan to Kazakhstan, typically ending at Almaty. Waiting time in queue was the principal cause of delay in both locations.

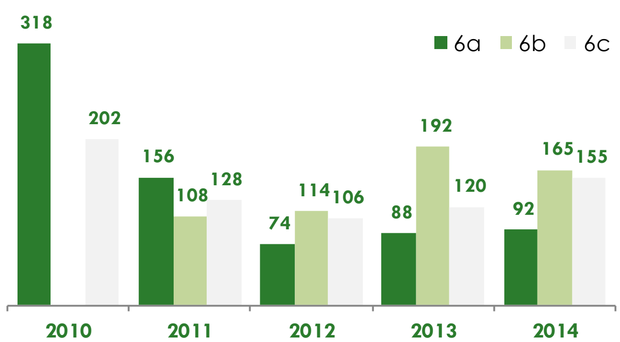
- **Dautota-Tazhen (UZB-KAZ)**
  Border crossing time averaged 13 hours in either direction. Waiting time constituted about 40% of the total time to cross the border. Uzbek drivers crossed here to send exports to Russia, while industrial equipment and

Figure 21: Corridor 6 Road TFIs

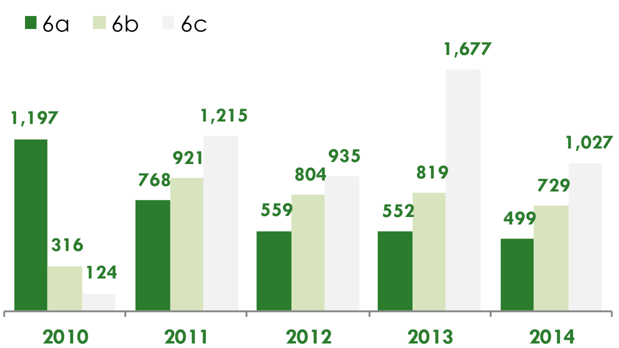
TFI1: Time taken to clear a border crossing point, hr



TFI2: Cost incurred at border crossing clearance, $



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



TFI4: Speed to travel on CAREC Corridors, kph

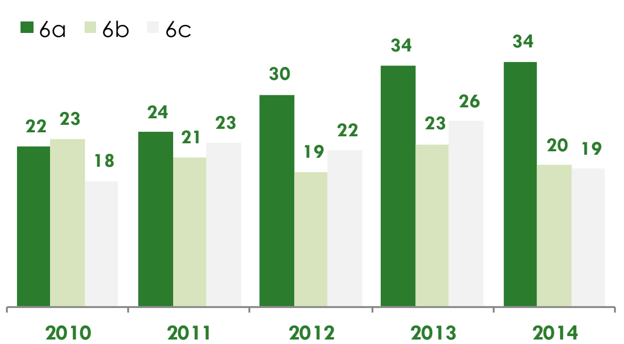


Figure 22: A private wagon leaving Termez and entering Hairatan, a border town in Afghanistan.

machinery were sent to Tashkent. Trucks carried goods in non-containerized form.

Hairatan-Ayraton (AFG-UZB)

CPMM data showed simple border crossing time which could be completed in 2 hours. However, this applied to only Uzbek drivers. Afghan drivers, on the other hand, faced severe restrictions when crossing. Most of them would not be granted a road pass or visa. At Hairatan, Afghan drivers would unload the goods. The exports would be transported by barge along the Amu Darya River operated by Uzbekistan nationals. The barge is not a reliable and regular service and in winter is subject to suspension for extended periods of time.

Peshawar-Torkham (PAK-AFG):

The performance of this BCP is reported under Corridor 5.

Railway Transport

CPMM in 2014 did not capture railways traffic along Corridor 6. This will be included in 2015.

At 6a, a railway service operates in Afghanistan, provided by Uzbekistan Railways. This line runs through Termez-Hairatan-Mazare-e-Sharif, extending 75 km into Afghanistan. The railway carries goods into Afghanistan, but Afghan exporters are not permitted to re-load the empty wagons and send them back to Termez for onward delivery. Thus, Afghan exporters cannot enjoy the benefit of lower cost of rail transport and continue to rely on road.

V. Impact of Pakistan

The extension of CAREC corridor alignments and addition of new sub-corridors have produced observable changes in the TFIs. This section describes the effects of including, for the first time in 2014, samples from Pakistan in CPMM. Pakistan joined CAREC in 2010 but CAREC corridors were only officially realigned in late 2013. In anticipation of CAREC corridor realignment, CPMM began collecting data in Pakistan, in collaboration with Pakistan International Freight Forwarders Association (PIFFA), from January 2012. However, the data were reported separately as corridors were not formally realigned at the time. Thus, CPMM already possesses three full years of data in relation to cargo movement in Pakistan (2012 to 2014). PIFFA submissions since 2012 enable CPMM to estimate Pakistan transport and trade data for two years prior to its formal inclusion in 2014.

Both to ensure comparability with corridor performance data as documented prior to 2014 and to assess the impact of including Pakistan data on CPMM indicators, two scenarios are presented:

- Pakistan data are not included in 2014
- Pakistan data collected since 2012 are included

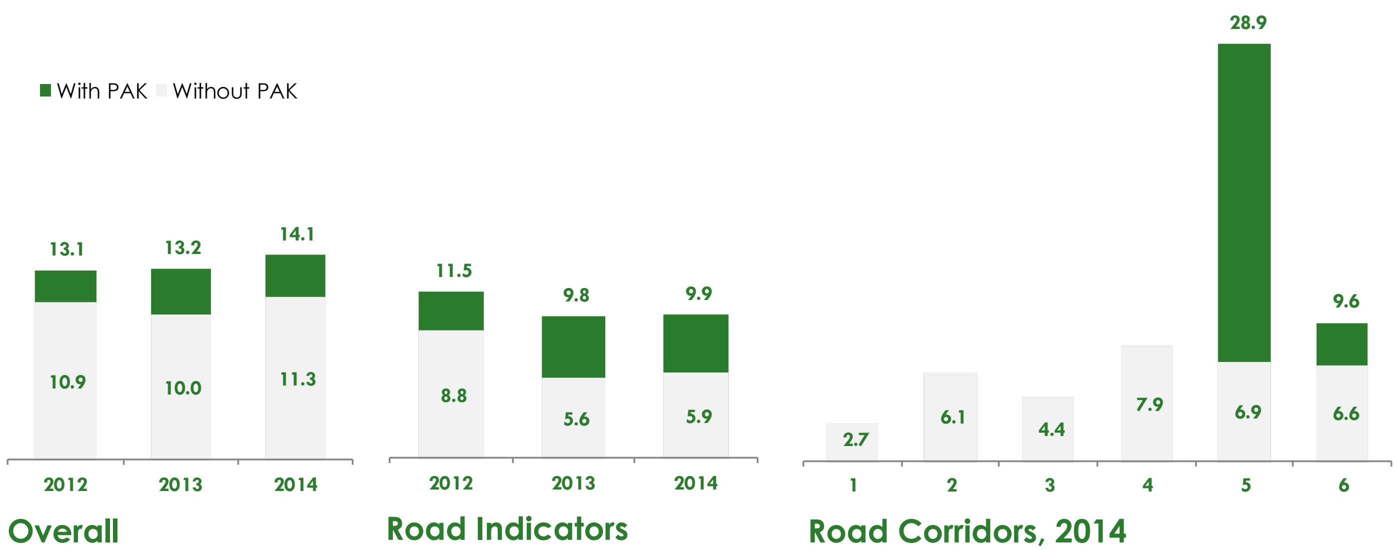
The extension of Corridors 5 and 6 into Pakistan resulted in a significant increase in TFI1 from 10 to 14.1 hours (+41%). Without Pakistan data, the overall indicator would not have deteriorated as much, increasing only to 11.3 hours (+13%). This increase is largely attributed to rail delays at BCPs which have been increasing since 2012.

To further isolate the effect of Pakistan BCPs on CPMM sample, analyses were limited to road transport only. As freight rail operations in Pakistan are limited, transport operators use trucking extensively for moving cargoes.

Road estimates for TFI1 exhibited the same trend: with Pakistan data in 2014, it jumped from 5.6 hours to 9.9 hours (+78%). Meanwhile, estimates reveal only a slight increase to 5.9 hours when delays at Pakistan BCPs are excluded from the sample.

The inclusion of Pakistan BCPs has had a sizeable effect on the indicator. Data coverage limited to original CAREC corridor alignments reveal inconsequential changes in the indicator comparing 2013 and 2014 in the scenarios presented, contrary to the substantial increase the indicator presently exhibits. It is reasonable to say that 2014 established a new baseline for TFI1.

Figure 23: TFI1: Time taken to clear a border crossing point, hr



Border-crossing points and Bottlenecks

The two border crossing points at the Afghanistan-Pakistan border, **Peshawar-Torkham** (PAK-AFG) and **Chaman-Spin Buldak** (PAK-AFG) are primarily responsible for the increase in average delay for the region. Shipment data collected by PIFFA monitor movements originating in Karachi and destined for Kabul or Kandahar.

Trucks heading to Kabul travel northwards to Sukkur-D.I. Khan -Peshawar-Torkham. Customs control begins at Peshawar, which is 55 km from Torkham. It is challenging to complete this section due to several police checkpoints which extort unofficial fees from trucks. Trucks carrying goods for Kandahar travel through Khuzdar-Quetta-Chaman-Spin Buldak-Kandahar. The road here is not as good as the Northern Route. The region is also less secure.

CPMM data reveal that principal delays at these BCPs are customs clearance (ranging 24-48 hours) and long waiting time (averaging 12 hours) on each side. The volume of traffic crossing Torkham is very high. There are intersections of cargo and passenger car traffic (see picture below). Without proper lanes and parking lots, the movement of traffic is disorganized, producing long waiting time in queues.

An automated exchange of information between Customs can cut down time spent on customs controls and documentation within a BCP. At present, Afghanistan uses ASYCUDA World while Pakistan uses WEBOC (Web-Based One Customs system). The former is an international information system developed by UNCTAD, while the latter is a proprietary system. Though both countries have expressed the desire to exchange information, technical and procedural differences impede the implementation of such plans.

Figure 24: **Torkham Border Crossing Point – Delivery trucks and passenger automobile cars are close to one another**

The key conclusions are:

- The inclusion of Pakistan's data is the primary cause of the year-on-year increase in TFI1 (41% overall and 78% for road) from 2013-2014.
- BCP pairs Peshawar-Torkham (PAK-AFG) and Chaman-Spin Buldak (PAK-AFG) along corridors 5 and 6 are plagued by long delays at the border, caused particularly by Customs clearance and waiting in queues.

VI. Efficiency of Rail Transport

In late 2013, a new CPMM data collection form was devised for railways to reduce confusion and enrich the analysis. Using this new form, five key railways routes were studied in 2014.[12]

1. **Chongqing-Duisburg**
   Distance: 11,179 km.
   This is the container express train. The route covers Chongqing-Dostyk-Małaszewicze-Duisburg.

2. **Chongqing-Almaty**
   Distance: 4,619 km.
   This is a conventional train service. The route covers Chongqing-Xi'An-Lanzhou-Urumqi-Bole-Almashankou-Dostyk-Aktogay-Saryozek-Almaty.

3. **Urumqi-Almaty**
   Distance: 1,281 km.
   This is a conventional train service. The route covers Urumqi-Bole-Alashankou-Dostyk-Aktogay-Saryozek-Almaty.

4. **Chongqing-Ulaanbaatar**
   Distance: 3,297 km.
   This is a conventional train service. The route covers Chongqing-Xi'An-Hohhot-Erenhot-Zamyn Uud-Ulaanbaatar.

5. **Tianjin-Ulaanbaatar**
   Distance: 1,692 km.
   This is a conventional train service Tianjin-Erenhot-Zamyn Uud-Ulaanbaatar.

Routes 1, 2 and 3 are alternative routes for PRC exporters. Strategically, route (1) container express trains compete with air freight and maritime transport. Routes (2) and (3) are similar and meant for exports to Central Asia. All trains in these routes cross Alashankou-Dostyk (PRC-KAZ). The key findings for these three routes are:

- Route 1 (container express trains) are faster overall compared to the conventional trains. Their main advantage comes from much faster border crossing, although it is observed that they move more slowly in transit due principally to the fragility of their cargo.
- Using container per km basis, container express train service is also cheaper than that offered by conventional trains.
- In Routes (2) and (3), the conventional trains move relatively fast (50 kph), but the overall speed is very slow due to long border crossing time.
- At Alashankou, the main delay was due to 'Restriction on Entry' which can take up to 90 hours.
- At Dostyk, multiple delays happened. Primary causes were 'Busy Reloading', 'No Wagons Available' and 'Marshalling'. Average time could take as take as long as 5 days.

Routes (4) and (5) end up in Ulaanbaatar, although the origins are different. All trains in these routes cross Erenhot-Zamyn Uud (PRC-MON). The key findings for these two routes are:

- Route 4 (Chongqing-Ulaanbaatar) moves faster and costs less than Route 5 (Tianjin-Ulaanbaatar). However, the overall speed is affected significantly by 'Waiting for Priority Trains to Pass' and 'Marshalling' at classification yards in PRC.
- On a container per km basis, Route 4 is about 50% cheaper than Route 5.
- The strategic implication is that a Mongolian trader can consider sourcing from Chongqing (which is an important manufacturing hub) instead of solely relying on importing via Tianjin.

12 The unit of transport is a 40-foot container in all five routes. This is to standardize the comparisons and avoid the impact of other factors such as material handling and weight.

Table 9: Comparison of Rail Routes

	Route 1	Route 2	Route 3	Route 4	Route 5
Distance (km)	11,179	4,619	1,281	3,297	1,692
Transit Time (hrs)	343	77	26	54	87
Activities Time (hrs)	104	385	117	417	82
Total Time (hrs)	447	462	142	471	169
Railways Cost ($)	8,518	5,035	2,387	4,318	4,466
Activities Cost ($)	1,177	606	570	557	501
Total Trip Cost ($)	9,696	5,641	2,957	4,875	4,967
SWOD (km/h)	33	60	50	61	19
SWD (km/h)	25	10	9	7	10
Railways Cost ($/500km)	381	545	932	655	1,320
Activities Cost ($/500km)	53	66	222	84	148
Total Trip Cost ($/500km)	434	611	1,154	739	1,468

Route 1: Chongqing-Duisburg Express Train
Route 2: Chongqing-Almaty
Route 3: Urumqi-Almaty
Route 4: Chongqing-Ulaan Baatar
Route 5: Tianjin-Ulaan Baatar

Route 1: Chongqing-Duisburg Express Train

Designated as a Class I border point, Chongqing is able to export commodities to international markets without the need to spend significant dwell time at border crossing. Being a Class I border point means that Chongqing can complete customs formalities and offer bonded storage for its goods. Incoming and outgoing goods can be cleared in Chongqing.

CPMM data (Table 9) clearly confirm the advantage of Class I border point categorization. The entire journey averaged 18 days to complete, including border crossing time. Noting the transit time and activities (stoppage time at border), the latter accounted for nearly 25% of the total duration.

In general, this 25% of delays happened mainly at Chongqing, Dostyk, and Małaszewicze. Customs controls and loading can be completed in less than a day in Chongqing. At Dostyk, the limited capacity resulted in 1-2 days of waiting time for the transfer process. Once the train leaves Dostyk though, there are no further customs controls in Russia and Belarus, resulting in a smooth transit. The next stop, Małaszewicze, requires a gauge change and some waiting time. In general, there is no customs control until the train reaches Duisburg.

However, at Małaszewicze, Customs may stop the train to inspect documents or examine cargoes in serious cases. This is normally applicable based on risk-based sampling, particularly when the shipper is new or the types of commodities carried are questionable. Still, it must be emphasized that this is an exception and not the norm.

The SWOD and SWD comparisons between express train and conventional train produce interesting observations. For express trains, speeds averaged 33 kph and 25 kph, respectively. For conventional trains, SWOD averaged 60 kph but SWD dropped to 10 kph. Thus, overall speed using SWD is still faster for express trains.

The slower SWOD for express trains is due to the nature of expensive, fragile commodities transported (e.g. HP computers and Mercedes automobiles). Central Asian and PRC wagons are subjected to slack actions that can send strong shocks to wagons near the end of the train. Consequently, the train operators deliberately run these trains at lower speed to prevent cargo damage. Using permanently coupled wagon could reduce slack action, as successfully used by US railways. This does required stronger engine sets for operating multimodal trains. To increase SWOD, railway operators may need to use more and stronger locomotives.

Route 2: Chongqing-Almaty

Chongqing is the first and only inland 'port' permitted to import or export fully assembled cars. In PRC, three seaports dominate the import of such products: Tianjin, Shanghai, and Guangzhou. CPMM data shows that assembled automobiles from Europe are now sent to Chongqing, some of which are then re-exported to Central Asia. This highlights the strategic significance of Chongqing as a consolidation and re-export

Box 3:

Latest Development on Chongqing-Duisburg Container Express Train

On 29 December 2014, the 100th container express train left Chongqing for Duisburg. The total distance spans 11,179 km, and takes 16-20 days to complete. The trains pass through six countries, namely PRC, Kazakhstan, Russia, Belarus, Poland, and Germany. Since the service was introduced in 2011, a total of 233 trips have been completed, transporting a total of 20,000 TEUs carrying cargoes worth $6.8 billion. Of the 233 trips, 210 trips were from Chongqing (outbound from PRC); while 23 trips were inbound (into PRC).

A trip typically consists of 41 40-foot containers. Commodities carried from Chongqing consist of notebooks, display instruments, flat screen TVs, hard-disks, LED lightings, automobile spare parts, and portable remote controls for games.

Roughly half of all products consolidated at Chongqing for export to Europe are manufactured principally in and around Chongqing and Chengdu. Due to rising labor costs in coastal cities and the return of migrant workers to home provinces, manufacturing has relocated to the western regions of PRC. Thus, manufactured consumer electronics from hubs like Chongqing and Chengdu are increasing sent via this service to Europe. The Yangtze Delta region (east) led by Shanghai accounts for 30%, and the Pearl Delta region (south) led by Guangzhou contributes the remaining 20%.

A present, it costs $9,600 for one 40-foot container using this service. If the same container is sent by sea to Europe, the cost will be (i) Inland rail from Chongqing to Shanghai costing $1,000, (ii) Ocean freight from Shanghai to Rotterdam that cost $3,000, (iii) Inventory carrying cost in 1.5 months of transport time estimated at $2,000. The total estimated cost is thus around $6,000 using ocean freight. To compete with sea freight, the cost of the container express train will need to reduce by 37.5%.

Different modes of transport have different strengths and limitations. While it may be unrealistic to expect rail to match the cost of maritime transport, costs can be reduced if there is more return cargo from Europe to PRC. This will be a key determinant on the sustainability of this service.

center. However, the assembled automobiles are moved on conventional trains.

A stark difference exists in the proportion of transit and activities (stoppage) time compared with the express train. They were calculated to be 77 hours and 385 hours, respectively, representing 17% and 83%, respectively. In fact, both routes took nearly the same amount of time, although Route 1 is nearly 3 times longer. This is due to the sizeable dwell time to which conventional trains are subjected.

There were two main reasons for this delay. The first occurred within Chinese terminals at Xi'An, Lanzhou, and Urumqi. These three locations are major railway terminals. At each node, 'Waiting for Priority Trains' to pass averaged 20-30 hours. Marshalling required another 10 hours.

The sizeable delays generated by 'Waiting for Priority Trains to Pass' are a product of the traffic imbalance observed along the east-west axis. Bulky commodities such as energy products, minerals, and coal are sent from Urumqi to the coastal cities, while lighter weight items such as manufactured products are sent westwards. Trains moving to Lanzhou-Urumqi have to compete for track access and rolling stock.

The second reason is border crossing. Trains can spend 4 days each at Alashankou and Dostyk. At Alashankou, the principal reason is due to 'Restriction on Entry', while waiting time due to 'Busy Reloading', 'No Wagons Available', and 'Marshalling' contributed to delays at Dostyk. The main advantage of using the Chongqing-Duisburg express train is that the train does not dwell at Alashankou.

In terms of cost, this conventional train is actually more expensive. Using 500km as a basis, a 40-foot container in Route 1 cost $434, whereas it cost $611 in Route 2 (40% more). Rail tariffs formed the majority of the cost. For border crossing, 'Change of railway gauge' and 'Customs Controls' were the two primary cost drivers. Activities necessitated by the break in gauge cost $130 for one 40-foot container. Customs controls were applied at Alashankou ($130) and Dostyk ($95).

Route 3: Urumqi-Almaty

This section is a sub-set of Route 2. The important difference, however, is that cargoes could come from origins other than Chongqing. The source for this shipment is Lianyungang, a seaport in Jiangsu that is designated to handle transshipment of goods bound for Central Asia. Data for the entire leg are not readily available, so CPMM focused on the Urumqi-Almaty section only.

Similar to Route 2, activities (stoppage) time was very large at 82% of the total time. Theoretically the time in motion was only 26 hours (about one day), but the entire journey could take 142 hours (more than 5 days).

The reasons for delays were similar to Route 2 (refer to Route 2 for details). However an important difference was that the delay in Alashankou appeared to be much shorter. In particular, 'Restriction on Entry' was 90 hours in Route 2 but only 15 hours in Route 3. The sizeable delays thus resulted in a high SWOD but low SWD for Route 3. SWOD was 50 kph, but SWD averaged 9 kph.

Railway transport cost among Routes 1, 2, and 3 revealed that Route 3 was the most costly on a per 500 km basis. The values for the three routes were $434, $611, and $1,154, respectively.

This route is discussed extensively in the Corridor Analysis. Please refer to Corridor 1 analysis.

Route 4: Chongqing-Ulaanbaatar

In 2014, CPMM showed shipments of motorcycles and glass bottles to Ulaanbaatar. All shipments were moved via rail using 40-foot containers. The distance is shorter than Chongqing to Almaty, but about 2 times longer than the most popular transit route, Tianjin to Ulaanbaatar (which will be elaborated in Route 5). The goods shipped were not surprising. As mentioned, Chongqing is granted the right to complete customs clearance of assembled automobiles for import and export. New and second-hand automobiles used to come solely via Tianjin. Chongqing is now able to send local manufactured automobiles or foreign imports to Mongolia, thus offering an alternative route. Glass bottles are also sent to Mongolia for bottlers to use, since production and packaging are under-developed in the country.

Table 9 reveals a similar pattern of time spent on transit and at sidings. About 90% of the time was non-value added. There were domestic factors and border crossing procedures that contributed to delays.

CPMM samples show long dwell time in PRC railway terminals. Notable dwell times were recorded in Dazhou, Baoji, Xi'An, Yulin, and Hohhot. At each terminal, 'Waiting for Priority Trains to Pass' took 40 hours. 'Marshalling' took another 10-20 hours. In total, about 3 days are spent inside each of the railway terminals. This observation was also reported in the third Quarterly Report for 2014.

Thus, even though the train registered SWOD of 61 kph, lengthy dwell times reduced SWD to 7 kph.

Border crossing activities also contributed to delays. At Erenhot, 'Restriction on Entry' could take 40 hours. Across the border at Zamyn Uud, there were a myriad of delays but the chief delay was due to lack of wagons, which could result in waiting time of 30 hours. Interestingly, 'Change of Railway gauge' was not lengthy: activities associated with the break in gauge could be completed within 5 hours. Customs controls were similarly short, which ranged 3 to 5 hours at each node.
In terms of cost, it appears that it is more costly to ship items to Ulaanbaatar compared to Almaty, from the same origin. Route 2 cost $611 per 500 km for a 40-foot container, but Route 4 cost $739. Currently there are no data for trucking cost from Chongqing to Ulaanbaatar. In future, it will be interesting to see if this service develops, given that origin-to-destination road transport is now possible since Corridor 4b construction is complete. Still, the distance is relatively large for trucking to be cost effective.

Route 5: Tianjin-Ulaanbaatar

This route, also known as CAREC Corridor 4b, is the most important transit corridor for Mongolia. Tianjin is the most important seaport for Mongolian imports and exports. The 1,000 km of railways is struggling under near full capacity and future expansion strategies to expand railways traffic remain a top priority for the government.

It takes 7 days for shipments to arrive in Ulaanbaatar from Tianjin. However, this duration excludes the dwell time in Tianjin port. The dwell time is unpredictable due to port congestion. Mongolian freight forwarders perceived that greater priority is given to goods destined for domestic PRC markets. As a result, the total duration ranges from 10 to 14 days.

Total overall costs were surprisingly similar for Routes 4 and 5. To a Mongolian importer, it cost close to $5,000 for importing a 40-foot container.

The advantage of Route 5 is the shorter time. Assuming a shipment arrives in Ulaanbaatar in 10 days, this compares favorably with shipments from Chongqing (Route 5), which can be expected to take as much as 20 days.

Both routes encountered the same stoppage activities at Erenhot-Zamyn Uud. Waiting time was the dominant reason. For Route 4 to be competitive, the dwell time experienced within PRC railway terminals must be reduced. For Route 4, shippers do not need to pay a transit fee, which amounts to $300 for a 20-foot container and $600 for a 40-foot container. For Route 5, this fee is payable since the containers can come from Yokohama (Japan), Pusan (South Korea), or Hong Kong, China.

Comparing the cost per 500 km, Tianjin-Ulaanbaatar is twice as expensive as Chongqing-Ulaanbaatar. However the expected total transport time of the former is 10 days compared to 20 days for the latter. Since the shipper or the importer may be more concerned about the total absolute cost and not necessarily use cost per 500 km as a consideration, Tianjin will still be popular. Most Mongolian imports move along this route, so international freight forwarders in Mongolia have greater know-how in handling the cargoes.

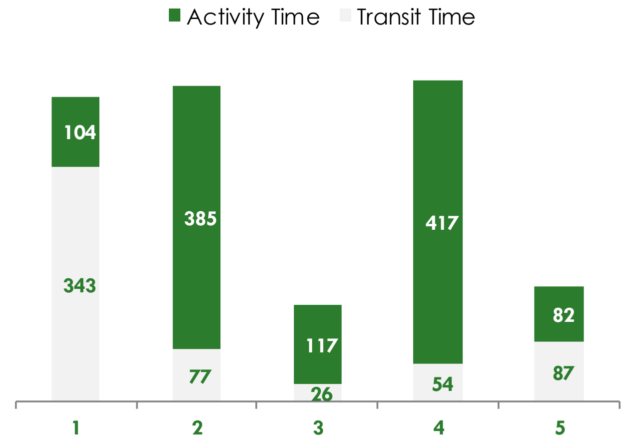
Inter-Route Comparison: Duration and Speed

This section analyzes the total time and speed of trains in each route. Both charts should be studied concurrently because the routes vary by distance.

The illustration shows the proportion of transit time and activities time over an entire journey for each of the five routes. Activities time measures the time in which the train is stationary. This is necessary due to border crossing procedures or marshalling within a terminal. Although it is not possible to eliminate such activities, railway efficiency depends on minimizing non-value added times, such as waiting time. Thus, by comparing the magnitude of transit time versus activities time, one can evaluate the scope of potential non-value added time.

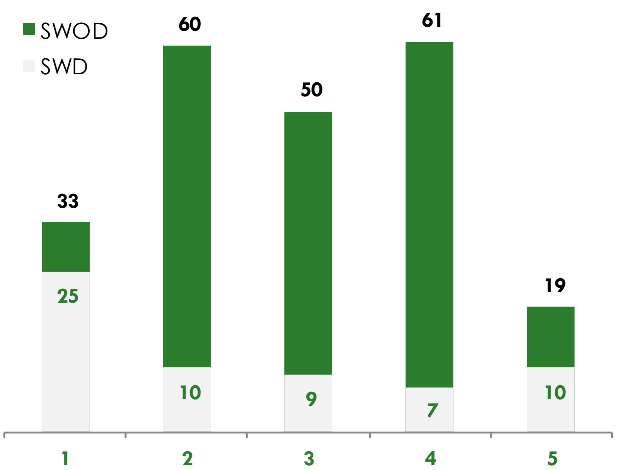
Routes 1, 2, and 4 have similar magnitude (around 450 hours, or 18-19 days). However Route 1 is 11,179 km long, while the other routes have shorter distances. The key reason is that Route 1 activities consume considerably less time over the

Figure 25: Duration of Transit and Activities, hrs



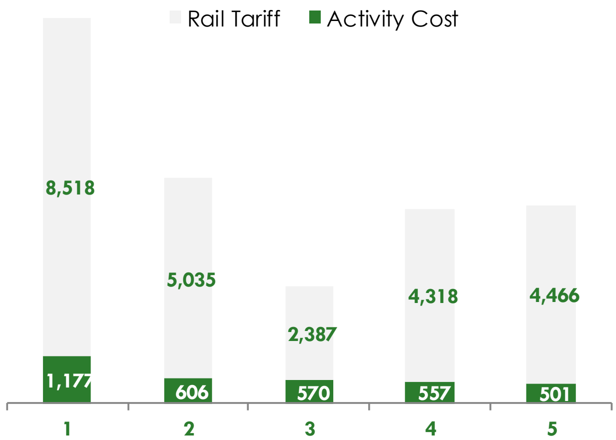
Distance (km)	11,179	4,619	1,281	3,297	1,692
Total Time (hrs)	447	462	142	471	169
%Activities	23%	83%	82%	88%	49%

Figure 26: Speed Indicators by Route, kph



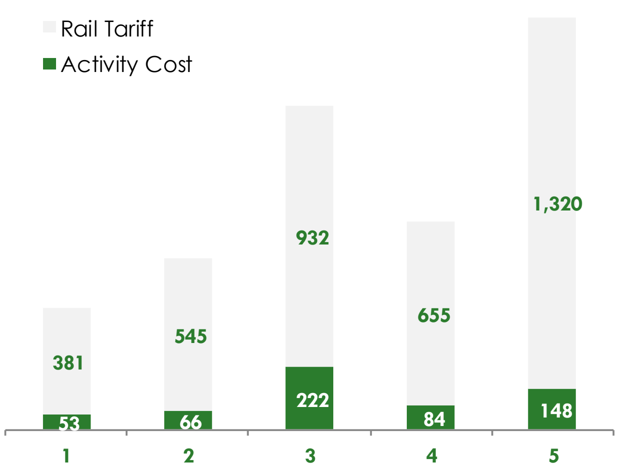
Route 1: Chongqing-Duisburg Express Train
Route 2: Chongqing-Almaty
Route 3: Urumqi-Almaty
Route 4: Chongqing-Ulaan Baatar
Route 5: Tianjin-Ulaan Baatar

Figure 27: Cost of Rail Tariffs and Activities, $



	1	2	3	4	5
Distance (km)	11,179	4,619	1,281	3,297	1,692
Total Cost ($)	9,696	5,641	2,957	4,875	4,967
%Activities	12%	11%	19%	11%	10%

Figure 28: Cost of Rail Tariffs and Activities, $/500km



Route 1: Chongqing-Duisburg Express Train
Route 2: Chongqing-Almaty
Route 3: Urumqi-Almaty
Route 4: Chongqing-Ulaan Baatar
Route 5: Tianjin-Ulaan Baatar

entire journey compared to Routes 2 and 4. By spending less dwell time in terminals and at border crossing points, trains can travel more distance in the same amount of time. This is why trains in Route 1 can achieve a SWD of 25 kph, even when the SWOD is less than other routes.

In fact, Routes 2, 3, and 4 each have activities time in excess of 80% of the total duration. The Chongqing-Duisburg train (Route 1) only has about 25% of time in stoppage. If one ignores the dwell time encountered in the Tianjin seaport, Route 5 (Tianjin to Ulaanbaatar) performs well too, having only 30% in stoppage.

A key message of this chart is to show that, through regional cooperation and a committed effort to streamline border crossing operations, railways can achieve substantially higher efficiency. Improved performance will increase rail's competitiveness with road transport. The latter is more costly but is generally much faster than railways. By closing the gap, price-sensitive shippers can be attracted to railways, in the process reducing the carbon footprint of their transport demand.

Inter-Route Comparison: Total Cost and Unit Cost

This section analyses the cost of using railways in each of the route. Shippers evaluate based on total cost. However, to compare efficiency, it is more accurate to assess using the 'per 500 km' as a basis of unit. This is because the routes vary by distance.

A breakdown of rail tariffs and activities cost show that the former is the dominant cost driver. Interestingly, all the routes reveal that the proportion of activities cost is about 10% of the total transport cost, with the exception of Route 3. In this Route 3 from Urumqi-Almaty, activities cost constitute 20% of the entire railways transport cost.

Using per 500 km cost, the Route 1 Chongqing-Duisburg service is actually the least costly, although the absolute sum is the highest. Route 3 and 5 stand out as most costly. A common characteristic of these two routes is the relatively shorter distance involved (Urumqi-Almaty is 1,281 km and Tianjin-Ulaanbaatar is 1,692 km). This supports the cost effectiveness of railways as a mode for long haul. In particular, Route 5 (CAREC Corridor 4b) has a comparatively high unit cost per 500 km. It is 2 times higher than Route 4 and 2.5 times higher than Route 2.

Conclusion for Policy Makers

Two key conclusions can be made from CPMM data.

- Activities time is very high, constituting about 80%, in conventional trains moving along CAREC Corridor 1 and 4.
- Railways tariff is the major cost driver for high railways transport cost.

This means that policy makers have to target carefully when designing intervention measures. To reduce total duration, the stoppage activities within the terminal and at the border crossing point have to be reviewed. Non-value added activities are to be eliminated, procedures and documents to be unified and harmonized, and operations simplified. CPMM offers some insights on the key reasons for delays, so the following could be instructive.

- 'No Wagons Available' is cited frequently as a major reason for waiting time at railways terminal. If the national railways operator is not in a position to finance new wagons, a possible solution is to demonopolize the wagon fleet. Russian railway experience in this regard may be instructive.
- 'Waiting time for Reloading' is another oft-cited reason. One can infer that operational improvements are long overdue, the capacity of railway facilities has to be expanded, or a combination of the two.
- 'Restriction on Entry' is also a consequence of capacity constraints. When classification yards are too occupied, arriving trains will be shunted to a siding. They will have to spend longer waiting time in the yard.

Other common reasons such as 'Transload at Gauge Change Point', and 'Waiting for Priority Trains to Pass' are important, but there is limited intervention possible. Gauge break will always be a problem and it is not feasible to expect that parties of the current system (whether users of 1,435 mm or 1,520 mm) will change to the other standard. Since track access is a constraint, trains will always compete for tracks. Emergency disaster relief supplies, food, energy, or even passenger trains will always be accorded higher priority compared to conventional freight trains, so this is unavoidable. Having said that, a positive development related to Chongqing-Duisburg line is that China Railways has granted this service higher priority, given that it features prominently in the 'New Silk Road Economic Belt'. The target is to reduce the current duration of 18 days to 16 days. Furthermore, additional tracks are being built at the section Chongqing to Lanzhou, which can reduce the total time to 14 days.

To combat escalating cost, one has to examine how railway tariffs are set. This is usually confidential information using complex formulae, and the shippers are 'price takers' due to the monopolistic structure of the industry. Policy makers can adopt two solutions. One is to encourage the national railway operator to spin off specialized companies engaged in ancillary activities to achieve higher efficiency. This is now being practiced in PRC and Kazakhstan. The strategy is especially feasible for large national railway operators that have grown into a huge asset base with different business interests. By re-focusing the company, the company may be able to increase productivity, the key to long term competitive advantage. The other is to offer subsidies for railways, especially targeting export shipments (to encourage an industrial ecosystem) such as currently practiced in Chongqing. The shortcoming here is that subsidies, like the services they support, are unsustainable over the long run unless the industrial ecosystem succeeds in fostering a viable niche market. This may be happening with the express service, but the jury is still out.

VII. Concluding Observations

Does intervention lead to improvement in transport and trade facilitation?

This is a central question asked by policy makers. This is precisely the motivation behind CPMM. Before CPMM, it was easy to calculate the investment cost for development projects, but it is harder to quantify the benefits. With the establishment of the Development Effectiveness Framework (DEfR) and the deployment of CPMM, it is possible to assess the effects of intervention efforts.

Besides intervention efforts by CAREC development partners, political will is critical. The success of the Chongqing-Duisburg express train shows that, with political will, it is possible to break barriers in international trade. The railway subsidies, the shortened border crossing time and the mutual recognition of customs controls make it possible for a notebook or an Apple device to leave PRC and arrive in Europe in 18 days. This is shown to be impossible using conventional trains, reflecting the various barriers and in particular border crossing operations. Another example is Karamyk and the Cross Border Transport Agreement (CBTA). Although CAREC has strongly supported CBTA, the Karamyk BCP at the Kyrgyz-Tajik border remains closed to international transit traffic, thus requiring trucks to travel an additional 300 km. Thus, intervention efforts alone cannot succeed without political will.

New developments could bring changes to trade patterns and the transport efficiency. Kyrgyz Republic is expected to join the Eurasian Economic Union. As shown in CPMM studies, this could result in border crossing inefficiencies with non-member countries. New regional agreements are being negotiated and formalized. For instance, the TAPI (Turkmenistan-Afghanistan-Pakistan-India) pipeline will change the energy network in the region. Rapid progress is made along CAREC 5b, where PRC is making large investments in the Karakorum Highway so that goods can move directly to Pakistan's Karachi. A trilateral agreement is being discussed between Afghanistan, Pakistan, and Tajikistan.

A fundamental and systematic improvement can only happen if a committed and sustained effort towards regional cooperation is achieved. Besides political realities, the region suffers from many man-made frictions. For instance, vehicle standards and procedures are more harmonized within core Central Asia countries (Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan), but significant differences exist between countries in South Asia (Afghanistan and Pakistan). Thus, for this reason, even though both trading blocs lie just beside each other, the volume and value of cross border trade between these two regions remain low. Likewise, despite many years of efforts, visas and road passes still pose impediments. This leads to the need to spend time on trans-loading of cargos between trucks.

It must also be acknowledged that while CPMM is very useful in highlighting problems 'at the border', it does not cover problems 'behind the border'. For instance, it is known that perishables are key export items for many CAREC countries. Such movement requires phyto-sanitary certificates. Yet the procedure to get such certificates can be cumbersome and involves unofficial fees. CPMM starts to collect data only at the point of origin when loading begins. Therefore any prior time and cost involved in getting approvals, licenses, and documents are not included.

Looking forward, CPMM will re-evaluate its methodology and continue to convert into information. With its large number of samples, the CPMM team will refocus efforts on improving data quality and reliability. In particular, efforts will be directed to the study of railway samples. Readers can refer to cfcfa.net for CPMM Quarterly and Annual Reports.

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 2014, the 13 CPMM partners working closely with CAREC include the following:

	Country	Association	
1	AFG	Association of Afghanistan Freight Forwarding Companies	AAFFCO
2	KAZ	Kazakhstan Freight Forwarders Association	KFFA
3	KGZ	Association of the International Road Transport Operators of the Kyrgyz Republic	AIRTO
4	KGZ	Freight Operators Association of Kyrgyzstan	FOA
5	MON	Mongolia Chamber of Commerce and Industry	MNCCI
6	MON	National Road Transport Association of Mongolia	NARTAM
7	PAK	Pakistan International Freight Forwarders Association	PIFFA
8	PRC	Chongqing International Freight Forwarders Association	CQIFA
9	PRC	Inner Mongolia Autonomous Region Logistics Association	IMARLA
10	PRC	Xinjiang Uygur Autonomous Region Logistics Association	XUARLA
11	TAJ	Association of International Automobile Carriers of Tajikistan	ABBAT
12	TAJ	Association of International Automobile Transport of Tajikistan	AIATT
13	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 eight CAREC member countries to standardize the implementation. They also analyze the aggregated data and draft the quarterly and annual reports.

ADB CAREC Secretariat

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

Sampling Methodology and Estimation Procedures

Each month, coordinators of each partner association randomly select drivers 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.

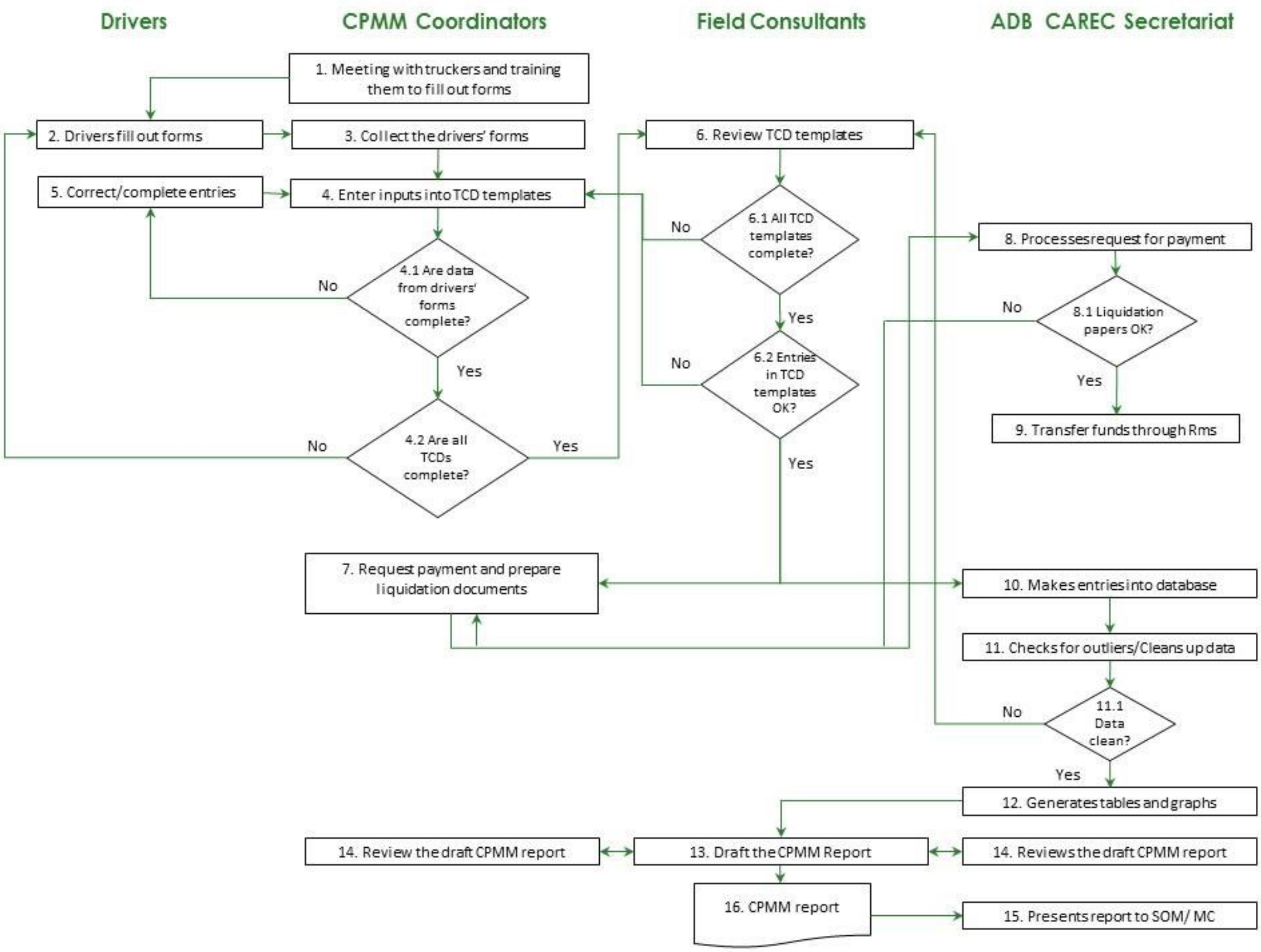
The following are the steps taken for normalization of each TCD sheet:

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

Trade Facilitation Indicators

	Overall						Road						Rail					
	2013			2014			2013			2014			2013			2014		
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	10.0	5.3	± 0.5	14.1	5.8	± 0.5	5.6	4.2	± 0.2	9.9	4.8	± 0.4	29.9	24.0	± 1.9	32.6	24.0	± 1.7
1	23.0	8.0	± 2.3	16.8	2.7	± 1.4	8.3	1.3	± 1.6	2.7	0.5	± 0.3	40.2	19.0	± 4.1	42.9	39.0	± 2.9
2	7.2	6.3	± 0.7	6.1	5.9	± 0.1	7.2	6.3	± 0.7	6.1	5.9	± 0.1	-	-	-	-	-	-
3	3.2	2.0	± 0.3	4.4	3.4	± 0.9	3.2	2.0	± 0.3	4.4	3.4	± 0.9	5.1	5.2	± 1.9	-	-	-
4	10.4	6.6	± 0.5	13.0	5.5	± 0.8	5.5	5.0	± 0.2	7.9	3.9	± 0.7	22.7	24.0	± 1.1	23.8	23.0	± 1.6
5	3.0	2.3	± 0.2	28.9	36.0	± 1.6	3.0	2.3	± 0.2	28.9	36.0	± 1.6	-	-	-	-	-	-
6	6.5	5.6	± 0.4	9.6	6.8	± 0.8	6.5	5.6	± 0.4	9.6	6.8	± 0.8	3.2	3.2	-	-	-	-
TFI2 Cost incurred at border crossing clearance, $																		
Overall	235	120	± 10	172	125	± 5	236	100	± 12	177	125	± 6	229	165	± 15	148	125	± 6
1	233	165	± 17	128	81	± 8	194	58	± 22	110	40	± 12	281	209	± 26	158	125	± 6
2	175	153	± 17	169	87	± 15	175	153	± 17	169	87	± 15	-	-	-	-	-	-
3	55	36	± 10	112	48	± 27	55	36	± 10	112	48	± 27	-	-	-	-	-	-
4	387	310	± 24	236	145	± 11	433	355	± 28	267	166	± 14	171	140	± 11	134	128	± 9
5	123	81	± 13	171	196	± 6	123	81	± 13	171	196	± 6	-	-	-	-	-	-
6	117	100	± 9	138	120	± 5	117	100	± 9	138	120	± 5	-	-	-	-	-	-
TFI3 Cost incurred to travel a corridor section, $ per 500km, per 20-ton cargo																		
Overall	1,467	1,018	± 49	1,360	937	± 46	1,596	1,124	± 57	1,359	938	± 51	911	600	± 71	1,364	926	± 105
1	1,261	831	± 94	1,180	939	± 62	1,450	1,054	± 127	1,123	954	± 73	944	599	± 123	1,278	819	± 113
2	610	497	± 51	513	481	± 15	610	497	± 51	513	481	± 15	-	-	-	-	-	-
3	2,167	1,902	± 161	2,348	1,162	± 301	2,245	1,922	± 162	2,348	1,162	± 301	403	451	± 116	-	-	-
4	1,177	1,229	± 54	1,269	1,031	± 86	1,437	1,378	± 51	1,126	1,031	± 54	917	778	± 84	1,478	1,075	± 193
5	2,393	2,451	± 124	2,050	1,882	± 96	2,393	2,451	± 124	2,050	1,882	± 96	-	-	-	-	-	-
6	1,145	548	± 114	769	517	± 60	1,150	550	± 114	769	517	± 60	93	93	± 316	-	-	-
TFI4 Speed to travel on CAREC Corridors, kph																		
Overall	20.0	18.2	± 2.2	20.8	20.6	± 1.7	22.3	20.0	± 2.4	22.9	21.5	± 1.8	13.3	9.8	± 4.0	11.4	9.2	± 2.4
1	23.4	20.5	± 5.8	24.1	24.5	± 3.2	28.0	22.6	± 7.9	28.3	27.5	± 3.8	18.0	18.6	± 6.6	15.6	10.9	± 3.4
2	23.8	22.2	± 5.1	23.6	22.1	± 3.7	23.8	22.2	± 5.1	23.6	22.1	± 3.7	-	-	-	-	-	-
3	22.0	21.1	± 4.9	27.2	23.7	± 5.9	21.8	20.8	± 5.1	27.2	23.7	± 5.9	25.6	25.9	-	-	-	-
4	12.0	10.4	± 2.5	15.9	12.4	± 3.8	15.2	14.3	± 3.5	19.9	20.5	± 5.0	8.6	8.0	± 1.7	8.1	7.7	± 1.4
5	18.1	15.9	± 4.3	17.1	18.0	± 2.0	18.1	15.9	± 4.3	17.1	18.0	± 2.0	-	-	-	-	-	-
6	27.7	31.0	± 4.3	25.3	30.6	± 4.7	27.8	31.1	± 4.3	25.3	30.6	± 4.7	16.9	21.6	-	-	-	-
SWOD Speed Without Delay																		
Overall	36.3	34.2	± 2.8	40.2	41.4	± 2.1	37.8	35.3	± 2.9	42.0	42.9	± 2.1	31.7	30.1	± 7.8	32.2	26.7	± 5.8
1	47.4	46.2	± 5.1	44.7	47.7	± 3.1	49.3	51.2	± 6.2	44.5	47.7	± 4.0	45.3	42.5	± 8.7	45.1	48.3	± 5.1
2	48.7	49.7	± 4.0	49.1	49.5	± 2.1	48.7	49.7	± 4.0	49.1	49.5	± 2.1	-	-	-	-	-	-
3	37.8	37.0	± 7.7	48.1	47.5	± 5.1	37.7	37.0	± 8.0	48.1	47.5	± 5.1	38.7	37.2	-	-	-	-
4	22.1	19.2	± 3.8	32.0	32.8	± 5.8	24.2	23.8	± 4.8	37.2	37.9	± 7.1	19.9	17.5	± 5.4	22.0	20.4	± 6.5
5	28.5	28.1	± 4.2	36.1	29.2	± 4.6	28.5	28.1	± 4.2	36.1	29.2	± 4.6	-	-	-	-	-	-
6	44.5	47.5	± 4.4	46.1	47.0	± 2.7	44.5	47.5	± 4.4	46.1	47.0	± 2.7	37.8	41.4	-	-	-	-

Better than same period last year, significant at 5% level

Worse than same period last year, significant at 5% level

Insignificant change

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

Appendix 6:
Cost Structure of TFI3

	Overall						Road						Rail					
	2013			2014			2013			2014			2013			2014		
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	1,467	1,264	203	1,360	1,130	230	1,596	1,369	227	1,359	1,129	230	911	809	102	1,364	1,136	228
1	1,261	1,063	198	1,180	977	203	1,450	1,210	240	1,123	944	179	944	815	129	1,278	1,034	244
2	610	503	107	513	390	123	610	503	107	513	390	123	-	-	-	-	-	-
3	2,167	2,079	88	2,348	2,138	210	2,245	2,153	92	2,348	2,138	210	403	403	-	-	-	-
4	1,177	907	270	1,269	942	327	1,437	982	454	1,126	715	410	917	832	85	1,478	1,272	206
5	2,393	2,131	262	2,050	1,845	205	2,393	2,131	262	2,050	1,845	205	-	-	-	-	-	-
6	1,145	934	211	769	503	266	1,150	938	212	769	503	266	93	93	-	-	-	-
%	**Percent to Total**																	
Overall		86%	14%		83%	17%		86%	14%		83%	17%		89%	11%		83%	17%
1		84%	16%		83%	17%		83%	17%		84%	16%		86%	14%		81%	19%
2		82%	18%		76%	24%		82%	18%		76%	24%						
3		96%	4%		91%	9%		96%	4%		91%	9%		100%	0%			
4		77%	23%		74%	26%		68%	32%		64%	36%		91%	9%		86%	14%
5		89%	11%		90%	10%		89%	11%		90%	10%						
6		82%	18%		65%	35%		82%	18%		65%	35%		100%	0%			

Appendix 7:
Q4 2014 Indicators

The TFIs for each quarter are shown in the illustrations below. In general, TFIs have improved when Q4 results are compared to Q1. TFI1 seems to remain flat, but cost exhibits a downward trend for both border crossing and traveling a section of 500 km. Speeds have also shown a moderate increase over the course of the year.

TFI1: Time taken to clear a border crossing point, in hours

In 2014, TFI1 remained relatively stable. The average border crossing times for road transport moved in a tight range of less than 10% of the mean value, except for road transport in Q2. The two BCPs of Peshawar-Torkham and Chaman-Spin Buldak, both situated on the Pakistan-Afghanistan border, are the most time-consuming locations. Khorgos (PRC-KAZ) is another complicated BCP, although the TFI has gradually reduced. Some attention must be paid to Shirkhan Bandar-Nizhni Panj (AFG-TAJ). At Shirkhan Bandar, the average border crossing time was 10.6 hours, significantly higher than past years. The time rose from 10 hours in Q3 to 11.3 hours in Q4. Rail patterns are highly correlated with the performance of trains crossing Alashankou-Dostyk (PRC-KAZ). At Alashankou, the average border crossing time rose from 30 hours to 36 hours in Q3-Q4.

TFI2: Cost incurred at border crossing clearance, in $

Both road and rail demonstrated a steady reduction in average border crossing cost. Between Q1 and Q4 in 2014, TFI2 for road and rail dropped by close to 19% each.
Considerable reduction in the road transport cost for Corridor 4 generated declining TFI2. Border crossing at Erenhot-Zamyn Uud (PRC-MON) experienced a decrease at Sub-Corridor 4b. TFI2 for Corridor 4b dropped from $382 in Q1 to $215 in Q4. Trucks crossing sub-corridor 4c (Bichigt), however, did not experience any change in the border crossing cost. The reduction of TFI2 for rail was attributed mainly to Corridor 1. In particular, Sub-Corridor 1c showed a drop from $202 in Q1 to $147 in Q4.

Figure 29: 2014 TFI1 Quarterly Trend, hrs

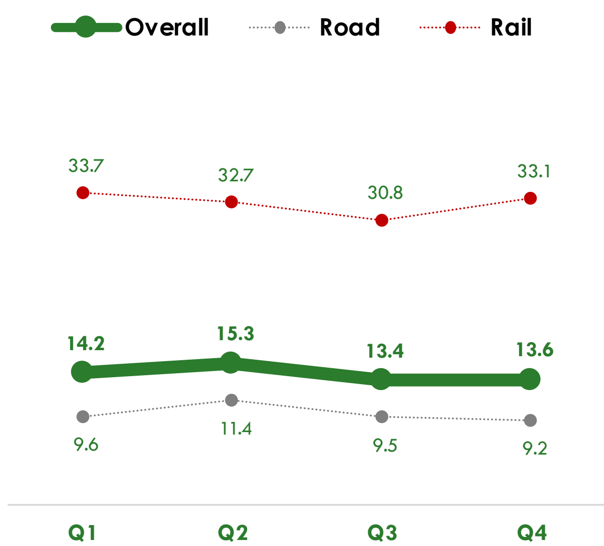


Figure 30: 2014 TFI2 Quarterly Trend, $

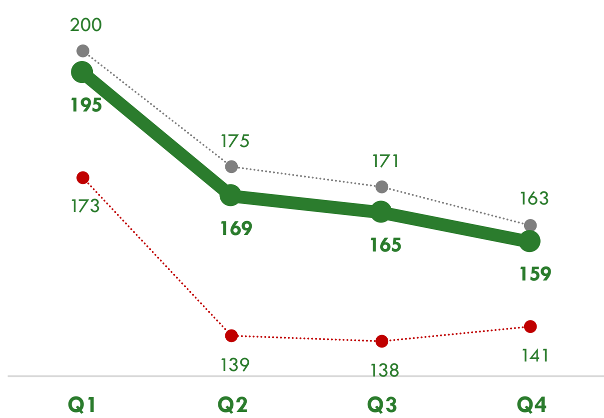


Figure 31: 2014 TFI3 Trend, $/500km/20-ton

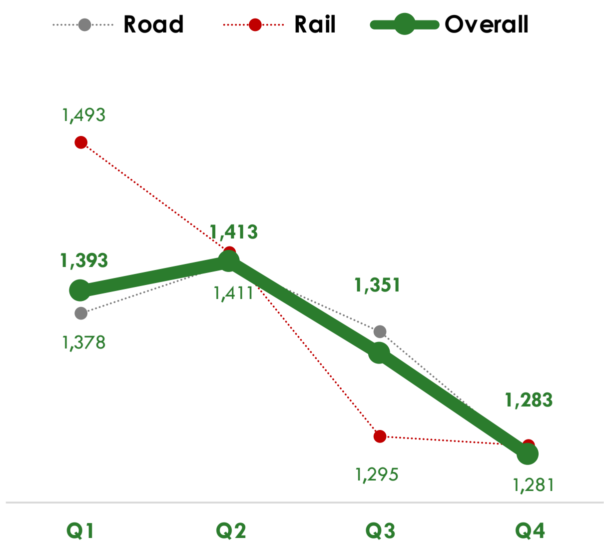
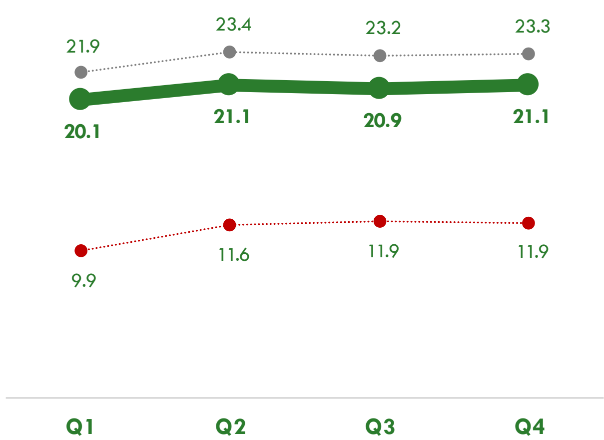


Figure 32: 2014 TFI4 Quarterly Trend, kph



TFI3: Cost incurred to travel a corridor section, in $ per 500km, per 20-ton cargo

It was puzzling to see the TFI3 for railways higher than road transport. Upon investigation, this was due to rail transport costs from Urumqi to Almaty.

In 2014 Q4, comparisons of shipment via trucks against via show that standardized cost to transport 20 tons of cargo is almost twice as expensive for rail wagons. This behavior severely affected rail transit cost indicators for Corridor 1.

In 2014, TFI3 for road transport peaked in Q2 and then declined towards the year end. This pattern correlates to fluctuations seen in Corridors 3a and 5b. For railways, the transport cost dropped from $1,390 to $993 from Q1 to Q4 2014.

TFI4: Speed to travel on CAREC Corridors, kph

TFI4 for both road and rail showed a gradual increase throughout 2014. For road transport, Corridor 4b registered the biggest jump from the beginning of the year. Starting at 15 kph, the SWD for Mongolian trucks reached close to 20 kph by Q4. The improvement, confirmed by trucking companies, validated the positive benefit of having a newly completed paved road from Zamyn Uud to Choyr. The speed could have been higher in Q4, but heavy snow restricted the driving speed of trucks.

Overall, railways also reported a moderate increase in SWD. The CPMM inclusion of the express trains from Chongqing to Duisburg, with its streamlined and simplified border crossing, helped to push up the SWD. Unfortunately, there are other counter-acting effects such as lengthy operations at Alashankou-Dostyk (PRC-KAZ) that hampered efficient crossing.

Appendix 8:
SWOD along CAREC Corridors

Figure 33: Speed Map, Road Corridors

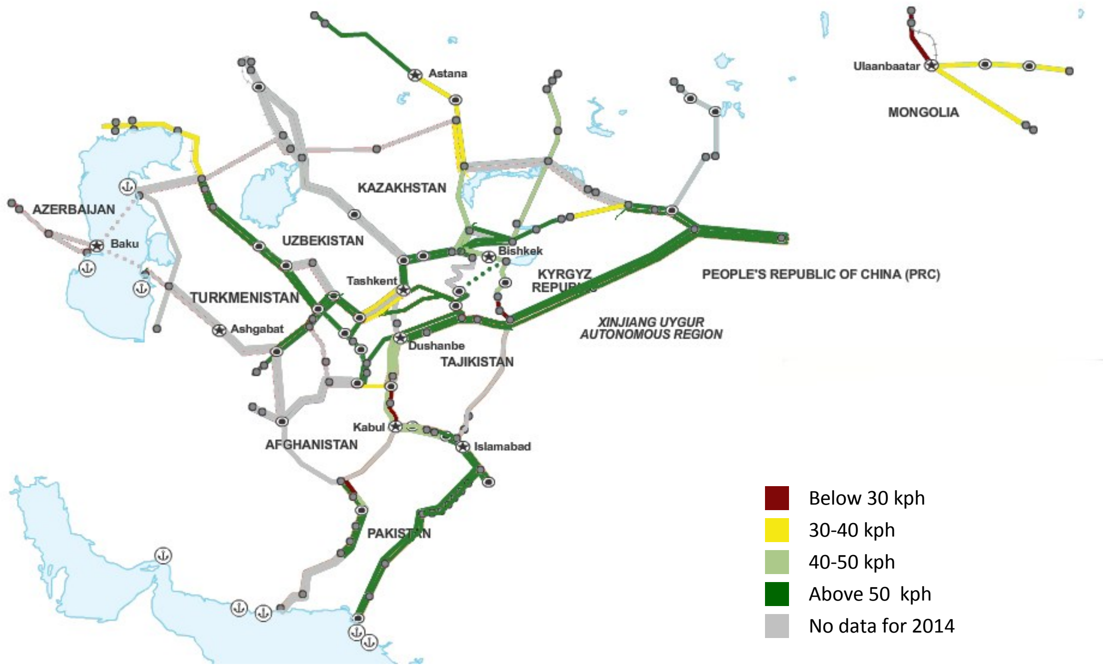
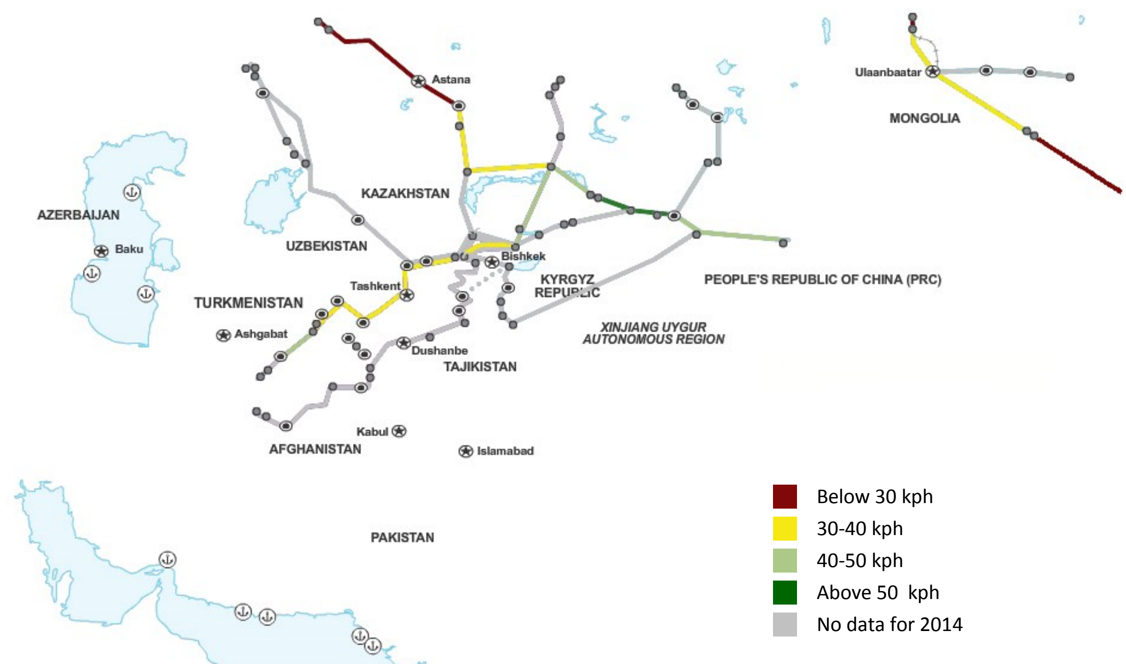


Figure 34: Speed Map, Rail Corridors



Appendix 8 (cont'd)

Figure 35: Corridor 1 Road Speed Map

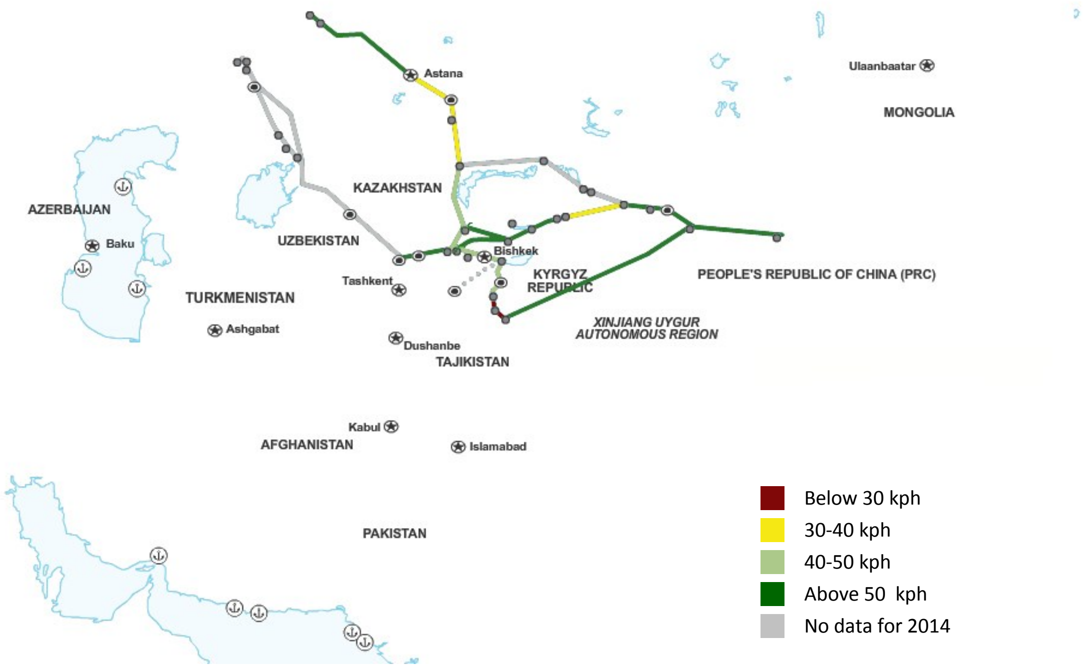
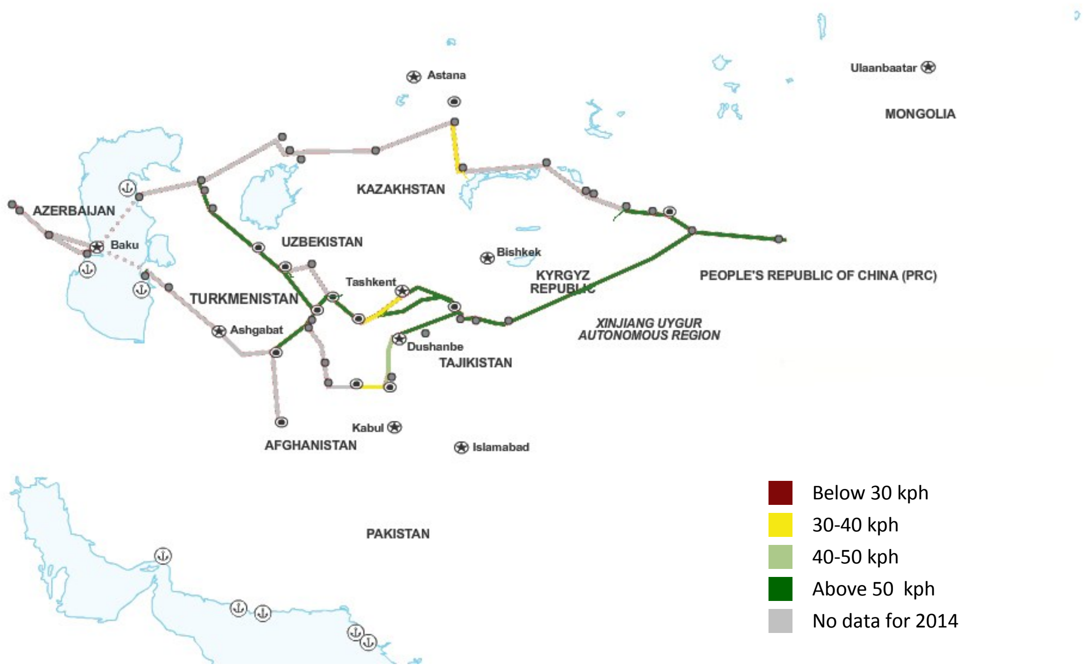


Figure 36: Corridor 2 Road Speed Map



Appendix 8 (cont'd)

Figure 37: Corridor 3 Road Speed Map

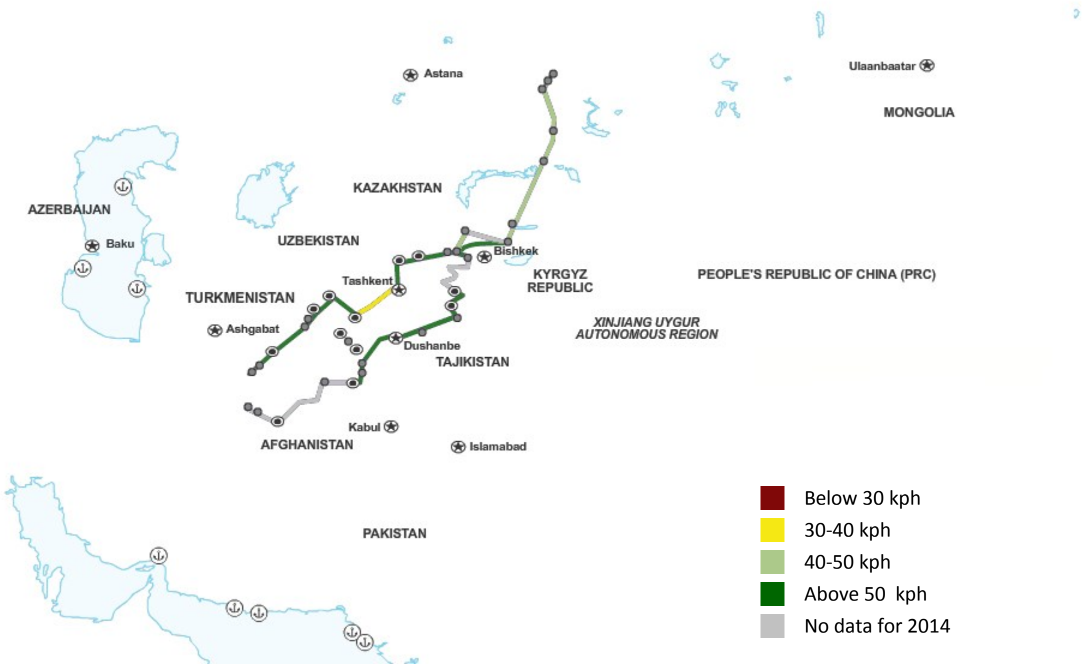
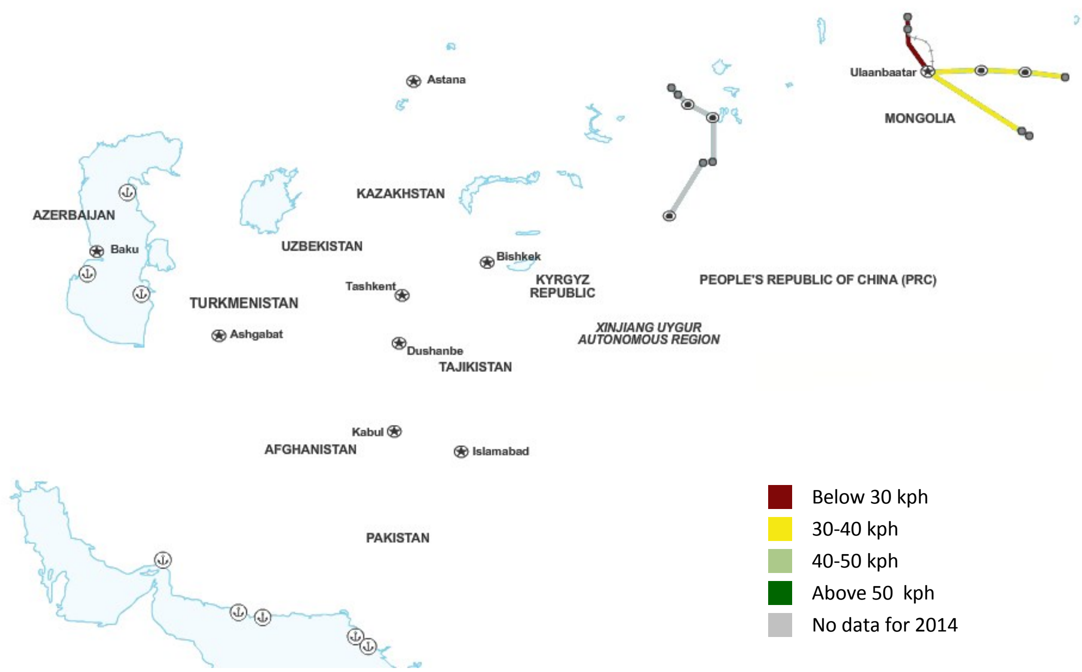


Figure 38: Corridor 4 Road Speed Map



Appendix 8 (cont'd)

Figure 39: **Corridor 5 Road Speed Map**

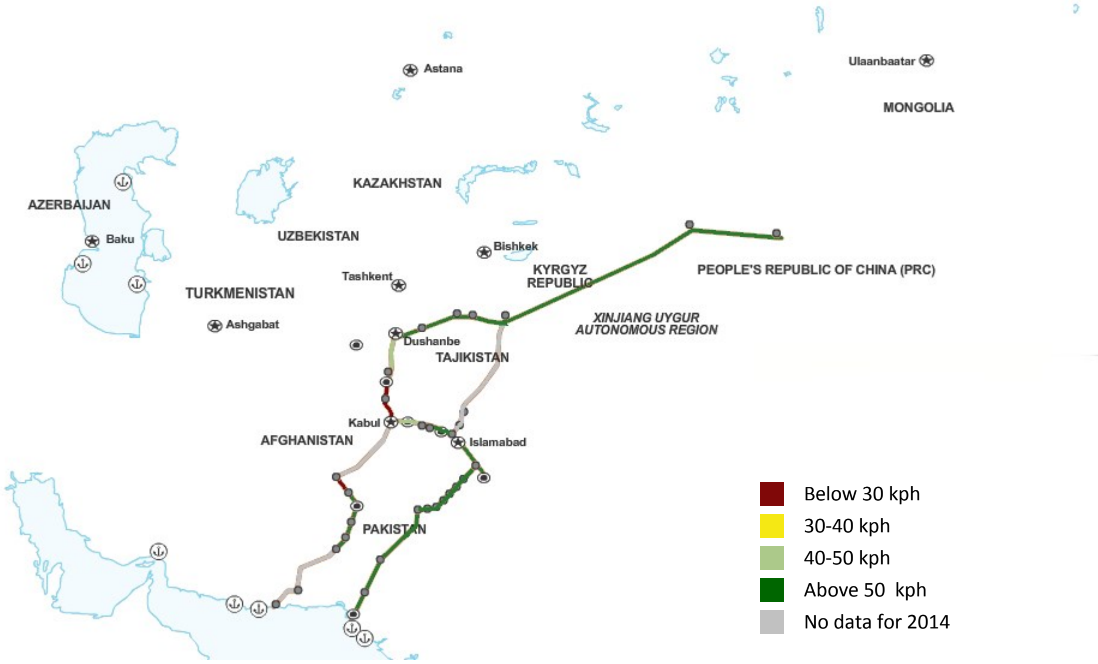
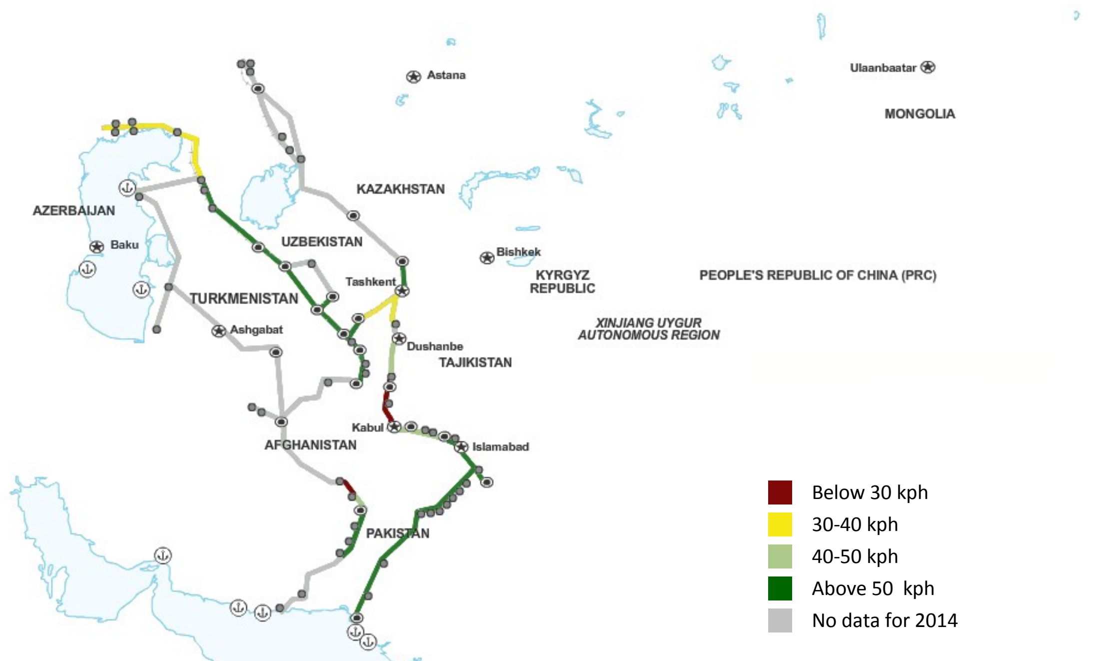


Figure 40: **Corridor 6 Road Speed Map**



Appendix 9:

Activities at Road BCPs, Outbound

Road, Outbound Traffic

Duration, hrs

BCP		Corridor	Count	Total Mean	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Chaman	PAK	5,6	24	36.0	36.0		24.0														12.0
Petuchovo	RUS	1,6	11	35.2	0.3	0.1	0.3														96.0
Peshawar	PAK	5,6	291	34.0	36.0	0.7	23.8												4.6		12.0
Khorgos	PRC	1	59	19.3	17.8	0.2	3.3	2.2			0.2				0.5				4.5		11.1
Erenhot	PRC	4	360	15.3	7.6	0.7	12.7	1.2	0.4	0.6	0.0	0.3	0.2		0.2	0.2			0.3	0.1	0.4
Veseloyarsk	RUS	3	28	13.1	0.3	0.1	0.2								0.2						120
Tazhen	KAZ	2,6	63	7.3	7.2	0.9	1.2	0.3	0.4				0.2	0.5	0.5	0.3					3.6
Sarahs	TKM	3	1	7.1	7.1	0.8	0.8	0.4							0.6	0.5					4.0
Dautota	UZB	2,6	83	6.9	6.8	0.7	1.2	0.4	0.6	0.7		0.4	0.3		0.5						3.7
Yallama	UZB	3,6	80	6.4	6.1	0.7	1.2	0.5	0.5			0.3	0.3	0.3	0.5		1.3				3.1
Alat	UZB	2,3	59	6.2	6.0	0.7	1.2	0.5	0.5	0.3			0.3		0.6	0.5					3.2
Sarasiya	UZB	3	50	5.7	5.7	0.7	1.1	0.3	0.4				0.3		0.5						2.8
Farap	TKM	2,3	71	5.5	5.6	0.8	1.1	0.3	0.3				0.3	0.4	0.5	0.4					2.7
Merke	KAZ	1,3	15	5.3	6.3	0.5	1.0	0.1	0.4	0.1				0.3	0.5	0.2					3.6
Dustlik	UZB	2	1	4.7	4.7	0.1	0.1							0.3	0.2						4.0
Nizhni Pianj	TAJ	2,5,6	238	4.5	2.3	0.3	0.3	0.2	0.2	0.3	0.2		0.3	0.3	0.4	0.3			0.5		4.9
Oibek	UZB	2,3,6	38	4.2	3.4	0.3	1.8	0.2	0.4	0.3	0.2	0.2	0.3	0.3	0.7						3.2
Taskala	KAZ	6	19	3.7	3.7	0.8								0.4							2.6
Keles	UZB	3,6	9	3.5	3.0	1.2				1.6		0.4	0.4	0.6							
Kurmangazy	KAZ	6	45	3.5	3.5	0.8						0.9	0.3	0.3							2.5
Khorgos	KAZ	1	6	3.0	2.5	1.3				1.5		0.3	0.5	0.4							
Saryagash	KAZ	3,6	15	2.6	2.8	1.3	1.0					0.4	0.6	0.6							
Khiyagt	RUS	4	70	2.1	2.0	0.3	0.4	0.3	0.3			0.3			0.3	0.3					0.4
Irkeshtan	PRC	2,5	5	2.1	2.0	0.2					0.2										1.8
Torkham	AFG	5,6	52	1.2	1.0	1.2	1.2					0.1	0.1	0.1					1.0		
Ak-Tilek	KGZ	1	103	1.2	0.4	0.1	0.2	0.1	0.1	0.1	0.1			0.2	0.2	0.2					3.4
Sherkhan Bandc	AFG	2,5,6	108	1.1	1.0								0.1		1.1			1.0	1.1	1.0	
Hairaton	AFG	3,6	70	1.1	1.0		0.7						0.1		0.5			1.2	1.0	1.1	
Kairak	KAZ	1	43	1.0	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1		0.1	0.1						4.7
Karasu	KAZ	1	150	0.8	0.5	0.1	0.2	0.1	0.1	0.1		0.1	0.1	0.1	0.2	0.1					5.6
Torugart	KGZ	1	15	0.7	0.3	0.1	0.1		0.1												2.2
Troitsk	RUS	1	41	0.7	0.2	0.1	0.1							0.2							3.7
Jana Jol	KAZ	1,6	2	0.3	0.3	0.1					0.1			0.1	0.1						
Torugart	PRC	1	32	0.3	0.1	0.1	4.0				0.2	0.2									
Aul	KAZ	3	11	0.1	0.1	0.1	0.1														

Cost, $

BCP		Total Mean	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Chaman	PAK	231	228	21	182	25	9	9			22		15				32	4	
Petuchovo	RUS	242	247	30	228												55		
Peshawar	PAK	50	16	5	22	3	3	3			2	3	7	3		22			
Khorgos	PRC	72	52	9	22	10	10	11		13	6	27	31	5					
Erenhot	PRC	90	90								6		11			89	90	87	
Veseloyarsk	RUS	30	26	9	16	7	6	6	6			8	7	2					
Tazhen	KAZ																		
Sarahs	TKM																		
Dautota	UZB	53	53	9	19	10	9				4	15	14	8					
Yallama	UZB	92	90		30						5		20			88	91	89	
Alat	UZB	60	60		60														
Sarasiya	UZB	127	130	29	46	13	10				5	18	15	12					
Farap	TKM	644	636		145	135							11				346		8
Merke	KAZ																		
Dustlik	UZB	79	91	30	32					6	8	6					93		
Nizhni Pianj	TAJ																		
Oibek	UZB	41	40	27						35	9	17							
Taskala	KAZ	25	20	18	50	20	20	20	25	5		21	100						
Keles	UZB	13	10	10	13							10							
Kurmangazy	KAZ	81	81	15	25	8	5	10	5			8		5					
Khorgos	KAZ	350	350		350														
Saryagash	KAZ	956	959		956														
Khiyagt	RUS	247	247		247														
Irkeshtan	PRC	46	55	35								17							
Torkham	AFG	27	30		20		11												
Ak-Tilek	KGZ	135	125	31	43	8	19	8				22	25	15					
Sherkhan Bandc	AFG	19	20							17	10	20							
Hairaton	AFG	7	6	6	9														
Kairak	KAZ	990	1013		990														
Karasu	KAZ	43	43	45						20									
Torugart	KGZ	30	30									30							
Troitsk	RUS																		
Jana Jol	KAZ	18	18	5					5			5	5						
Torugart	PRC	10	10										10						
Aul	KAZ	95	95	35	22	15							11	12					

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

■ More than 1 hour

■ More than $100

Appendix 10:

Activities at Road BCPs, Inbound

Road, Inbound Traffic

Duration, hrs

BCP		Corridor	Count	Total Mean	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Spin Buldak	AFG	5,6	24	60.0	60.0		48.0														12.0
Torkham	AFG	5,6	338	39.5	60.0	1.1	31.9						0.1	0.2	0.8				1.0		12.0
Peshawar	PAK	5,6	21	25.2	28.0		24.3											1.2	3.3		
Sherkhan Bandc	AFG	2,5,6	120	10.6	10.3	0.4	0.4	0.3	0.3	0.3	0.4				0.4	0.6			3.5	0.4	3.8
Zamyn Uud	MON	4	360	8.7	5.6	0.6	8.9	0.9	0.3	0.5	0.0	0.3		0.3	0.3	0.3				0.3	0.4
Tazhen	KAZ	2,6	83	7.8	7.9	0.9	1.3	0.4	0.5	0.8			0.4	0.6	0.5	0.4					3.6
Konysbayeva	KAZ	3,6	80	7.5	7.8	0.8	1.4	0.7	0.7			0.3	0.4	0.6	0.7	0.4					3.3
Farap	TKM	2,3	59	7.3	6.8	0.8	1.3	0.6	0.4	0.4	0.6		0.3	0.5	0.5	0.4				0.5	3.0
Aisha Bibi	KAZ	0	1	7.0	7.0	0.3	0.5	0.2													6.0
Khorgos	KAZ	1	75	6.8	6.3	0.5	3.7				0.2	0.5	0.7	0.9							3.3
Fotehobod	TAJ	2,3,6	10	6.6	6.5	1.0	1.3		0.7						0.6						3.1
Chaldovar	KGZ	1,3	11	6.5	6.4	0.7	1.3		0.6				0.3		0.5						3.3
Irkeshtan	KGZ	2,5	5	6.1	6.3	0.2	3.2	2.6			0.2										
Sarahs	TKM	3	61	6.1	5.8	0.8	1.2	0.3	0.4		0.6		0.3	0.4	0.5	0.4				0.4	2.2
Ayraton	UZB	3,6	1	6.0	6.0	2.7						1.0	0.6	1.8							
Dusti	TAJ	3	50	5.8	5.7	0.9	1.4	0.4	0.5				0.4		0.4						2.8
Dautota	UZB	2,6	89	5.8	5.8	0.6	2.0	0.3	0.4	0.3	0.2	0.8	0.2	0.4	0.5	0.3					3.2
Alat	UZB	2,3	71	5.3	5.2	0.7	1.1	0.3	0.4				0.3	0.3	0.5	0.5					2.4
Kulma	TAJ	0	240	5.0	4.9	0.3	0.4	0.2	0.2	0.2					0.4	0.3					2.9
Altanbulag	MON	4	70	4.8	4.9	0.3	3.4	0.3	0.3		0.3			0.3	0.3	0.3					0.4
Keles	UZB	3,6	16	4.3	4.3	2.0	1.4					0.6	0.8	0.7							
Dostuk	KGZ	2	1	3.3	3.3	0.1	0.5			0.2				0.3	0.2						2.0
Zhaisan	KAZ	1,6	1	2.7	2.7	0.6						0.3	0.8	1.0							
Kurmangazy	KAZ	6	36	2.6	2.4	0.9							0.2								1.7
Hairaton	AFG	3,6	39	2.6	2.6	0.8	0.7	0.6					0.1		0.5				1.0		
Karamik	TAJ	2,3,5	20	2.3	2.5	0.3	0.3	0.3	0.3	0.4	0.2			0.3		0.4					
Karasu	KAZ	1	107	1.6	0.8	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2					5.0
Torugart	KGZ	1	32	1.4	0.6	0.1	0.3	0.5	1.0			0.3			0.3				4.0		0.5
Saryagash	KAZ	3,6	7	1.0	0.9	0.7						0.4		0.5							
Troitsk	RUS	1	45	0.4	0.2	0.1	0.2							0.2	0.1						2.2
Ak-Tilek	KGZ	1	150	0.4	0.4	0.1	0.1	0.1	0.1	0.1	0.1			0.2	0.2						3.0
Petuchovo	RUS	1,6	2	0.4	0.4	0.1	0.1					0.1		0.2	0.1						
Kairak	KAZ	1	41	0.3	0.2	0.2	0.1	0.1	0.1	0.1		0.1		0.2	0.1						1.8
Veseloyarsk	RUS	3	11	0.2	0.3	0.1	0.3														
Krasnyi Yar	RUS	6	2	0.2	0.2	0.2		0.1													
Aul	KAZ	3	28	0.2	0.2	0.1	0.1														
Jana Jol	KAZ	1,6	11	0.1	0.2	0.1															
Torugart	PRC	1	15	0.1	0.1	0.1															

Cost, $

BCP	Total Mean	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Spin Buldak	198	198		198														
Torkham	148	151	30	127						5	6	20				92		
Peshawar	276	287		231											89	65		
Sherkhan Bandc	275	276	7	50	6	6	6	6				8	6			32	150	
Zamyn Uud	383	220	31	447	17	4	8									5	8	8
Tazhen	134	125	24	42	14	17	55			11	22	14	17					
Konysbayeva	169	170	34	47	26	28			6	15	36	18	18					
Farap	243	309	17	24	11	8	5	79		4	77	13	6				162	
Aisha Bibi	240	240	20	200	10							10						
Khorgos	308	320		332					23		20							
Fotehobod	79	75	23	32		11						15						
Chaldovar	120	120	33	43		20				10		20						
Irkeshtan	250	250		242	6			2										
Sarahs	300	298	16	24	10	11		77		5	6	12	6				160	
Ayraton																		
Dusti	62	70	18	25	15	11				6		15						
Dautota	91	96	20	35	8	5	10	5	10		9		5					
Alat																		
Kulma	78	77	7	43	6	4	4	4				9	4					
Altanbulag	659	654		649	3											10	7	8
Keles	31	30		10					25		24							
Dostuk	100	100		50							40	10						
Zhaisan	20	20									20							
Kurmangazy	34	32	33							5								
Hairaton	152	150	30	30						7		20				91		
Karamik	30	18	2	12	2	3	4	2			3		2					
Karasu	96	68	13	42	8	9	8	8	15	6	38	22	26					
Torugart	27	31	10	8	5				2			7						
Saryagash	20	20							20									
Troitsk	66	13	11	530							10	8						
Ak-Tilek	25	25	11	13	7	8	5	8			9	5						
Petuchovo	8	8							5			10						
Kairak	21	11	13	10					35		32	13						
Veseloyarsk	906	889		906														
Krasnyi Yar	12	12	10		13													
Aul	10	6	6	12														
Jana Jol	6	6	6															
Torugart																		

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

More than 1 hour

More than $100

Appendix 11:

Activities at Rail BCPs, Outbound and Inbound

Rail, Outbound Traffic

Duration (hrs)

BCP		Corridor	Count	Total Mean	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Ala Shankou	PRC	1,2	148	42.4	23.0												4.4						4.0	42.4	8.6	7.3	36.0
Erenhot	PRC	4	140	30.7	24.0										12		11.8				25.9			36.2			
Khorgos	PRC	1	25	23.9	22.0												4.5							19.4			
Naushki	RUS	4	60	11.5	12.0																11.5						
Zamyn Uud	MON	4	120	3.1	1.3											1.0	3.1				1.3						

Cost, $

BCP	Total Mean	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Ala Shankou	139	85												88							66	22	19	39
Erenhot	113	113												113										
Khorgos	77	65												65							36			
Naushki																								
Zamyn Uud	86	80					80	90																

Rail, Inbound Traffic

Duration (hrs)

BCP		Corridor	Count	Total Mean	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Dostyk	KAZ	1,2	148	59.7	46.5	1.0				5.1			4.0	3.2		0.5	3.6				42.3	2.0	17.3		7.5		13.9
Erenhot	PRC	4	120	44.4	24.0					38.4											12.0						
Altynkol	KAZ	1	25	37.4	39.0					5.3				4.0			3.7				7.3		19.7		8.2		
Zamyn Uud	MON	4	140	23.7	20.2			1.9		1.5				3.1		2.5	2.1		2.3		15.4		23.1				
Sukhbaatar	MON	4	60	15.0	13.3						1.0					2.5	2.1				9.7						
Farap	TKM	2,3	20	14.9	15.0												5.5				11.7			10.6			
Keles	UZB	3,6	20	0.8	0.5												0.9										

Cost, $

BCP	Total Mean	Total Median	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Dostyk	235	215					135							100										
Erenhot	239	280					178											121						
Altynkol	125	125					95							30										
Zamyn Uud	117	128			15		42							60		97								
Sukhbaatar	15	15											15											
Farap	158	190												158										
Keles																								

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

More than 1 hour

More than $100

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

Tel. (632) 632 5945
Email: yqian@adb.org

Jeff Procak
Regional Cooperation Specialist,
EAPF, East Asia Department
Asian Development Bank

Tel. (632) 632 5701
Email: jtprocak@adb.org

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

Tel. (632) 632 6960
Email: yuebinzhang@adb.org

Maria Cristina Lozano Astray
Regional Cooperation Specialist,
EAPF, East Asia Department
Asian Development Bank

Tel. (632) 632 4285
Email: clozano@adb.org

CENTRAL ASIA REGIONAL ECONOMIC COOPERATION
TRADE FACILITATION