Transport Emission Assessment of CAREC Border Crossing Points

CAREC WGCC Meeting | Bishkek, 7-9 April 2025

Background

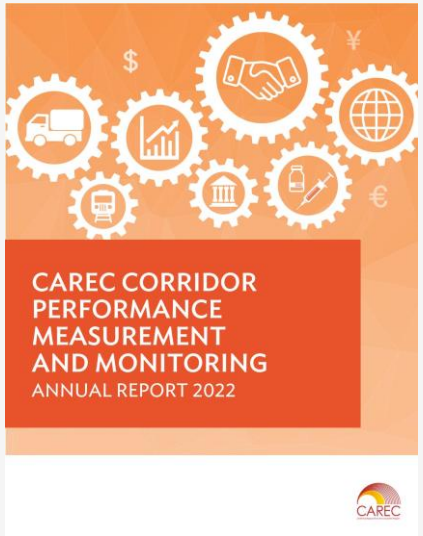
A. Study Scope

- Estimate of operational emissions from diesel-powered goods vehicles while idling at CAREC border crossing points (BCPs)
- Idling is defined as running an internal combustion engine while stationary
- BCPs analyzed were those shown on the standard CAREC list (not exhaustive but covers principal crossing points. https://www.carecprogram.org/uploads/CAREC-Border-Crossing-Points-List.pdf. Accessed 9 Sep 2024)

B. Assumptions

- Made on estimates of CO2e emissions (grams per minute that a goods vehicle is idling and equipment in use while idling
- The number of minutes that a goods vehicle spends idling during the time taken to clear a BCP
- The number of trucks that cross CAREC BCPs

Estimates of idling times



A. CPMM Data

- Estimates of time spent idling is based on the results of annual corridor performance surveys carried out as part of CAREC Corridor Performance Measurement and Monitoring (CPMM) for 2019 to 2023.

B. CPMM results are aimed at assessments of corridor performance

- Not ideal for an assessment of idling time as averages omit trucks that do not queue (queuing times overstate the average waiting time incurred by all trucks; there are many instances of average queuing times exceeding average times to clear border)
- Queuing at one BCP is often affected by congestion at the subsequent BCP (this effect cannot be identified in CPMM results)
- Time taken for a group of trucks to transit both BCPs is not recorded (CPMM does track consignments, and so averages should represent cohort characteristics).
- Sample sizes are often small and may be different for each of a pair of BCPs.

→ In practice, however, and despite all the caveats, there is little alternative to using CPMM times to estimate idling times

Results

- **Total annual emission estimate of 95,000 tons** (adding an assumed 500 ton/year from BCPs with insufficient data)

- For context, **it is about half the estimated 176,000 tons of annual operational emissions from vehicles using the Issyk Kul ring road (IKRR) in the Kyrgyz Republic in 2023.**

*(*The IKRR is 441 km long and in 2023 carried a weighted average of 4,600 veh/day of which 250 were medium and heavy goods vehicles.)*

Ref	BCP name	Country	Idling times (hours)		Goods traffic	Emissions
			Outbound	Inbound	veh/day	ton/year[b]
P01-1	Hairatan	AFG	0.6	0.6	228	400
P01-2	Termez	UZB	0.8	0.3	228	330
P03-1	Torkham	AFG	2.6	2.6	1,100	9,910
P03-2	Landi Kotai	PAK	2.6	6.0	1,100	16,510
P04-1	Shirkhan Bandar	AFG	2.5	6.2	32	490
P04-2	Nizhni Pianj (Panji Poyon)	TAJ	0.5	1.8	32	130
P07-1	Red Bridge	AZE	3.7	0.8	445	2,850
P07-2	Red Bridge	GEO	9.8	0.5	445	6,480
P09-1	Takeshiken	PRC	6.5	1.1	117	1,560
P09-2	Yarant	MON	0.7	5.0	117	1,170
P10-1	Erenhot	PRC	1.9	1.9	470	3,070
P10-2	Zamyn Uud	MON	0.5	0.5	470	750
P11-1	Khorgos	PRC	17.8	1.5	949	25,700
P11-2	Korgas	KAZ	0.1	0.7	949	1,050
P12-1	Torugart (Topa)	PRC	36.3	0.8	103	6,700
P12-2	Torugart	KGZ	24.0	1.4	103	4,580
P13-1	Irkeshtan	PRC	0.3	0.6	83	120
P13-2	Irkeshtan	KGZ	0.3	0.3	83	90
P16-1	Karamik	KGZ	0.6	0.2	BCP closed	N/A
P16-2	Karamik	TAJ	0.3	0.2	BCP closed	N/A
P17-1	Aul	KAZ	0.1	0.1	No traffic data	N/A
P17-2	Veseloyarsk	RF	0.1	0.1	No traffic data	N/A
P18-1	Kairak	KAZ	0.7	0.3	No traffic data	N/A
P18-2	Troitsk	RF	0.0	0.1	No traffic data	N/A
P19-1	Zhaisan	KAZ	1.1	0.2	No traffic data	N/A
P19-2	Novomarkovka	RF	No data		No traffic data	N/A
P22-1	Tazhen	KAZ	1.4	1.3	200	1,850
P21-2	Daut-Ata	UZB	1.2	0.5	200	1,200
P37-1	Zhibek Zholy (Konysbaeva)[c]	KAZ	1.4	0.4	1,300	7,900
P37-2	Gisht Kuprik (Yallama)	UZB	0.8	0.3	1,300	5,190
P26-1	Kotyaevka (Kurmangazy)	KAZ	0.6	0.4	No traffic data	N/A
P26-2	Krasnyi Yar	RF	0.6	0.1	No traffic data	N/A
P51-2	Sukhbataar (Altanbulag)	MON	0.1	0.1	110	20
P51-1	Naushki	RF	0.0	0.0	110	20
P31-1	Pakhtaabad	TAJ	1.4	0.8	67	200
P31-2	Saryasia	UZB	1.1	0.6	67	160
P32-1	Alyat	UZB	1.0	0.5	No traffic data	N/A
P32-2	Farap	TKM	3.4	0.7	No traffic data	N/A
Total						88,750

Review of Low Emission Zone Best Practices and Recommendations for Almaty, Kazakhstan

CAREC WGCC Meeting | Bishkek, 7-9 April 2025

Background

- Almaty, Kazakhstan's largest city with 2.1 million residents, **faces significant air quality challenges**
- To address these challenges, Almaty is exploring the **implementation of a low emission zone (LEZ)** as part of broader city-wide sustainability initiatives
- LEZs are **designated areas in cities where access by certain vehicles is restricted or discouraged based on emission standards**
- LEZs are implemented as part of a **broader plan for clean air and safer streets** (including measures to promote walking, cycling, and public transit as in hundreds of cities around the world)
- LEZs have been found to **improve air quality, improve public health outcomes, promote cleaner transportation and reduce greenhouse gas emissions**

Solid fuel use pollution and measures

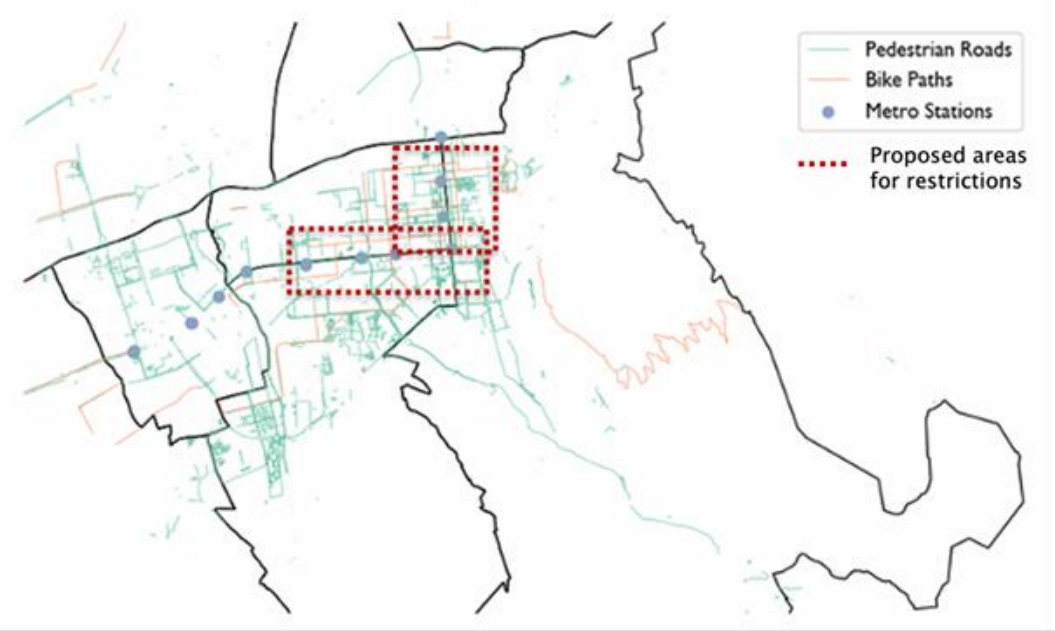
- Analysis of the Clarity Air Quality Monitor network data reveals that PM2.5 mass concentration levels are **predominantly elevated during the winter months, particularly in the evenings**
- Average PM2.5 levels are highest in the **northern districts of Alataysky, Zhetinsky and Turk districts.**
- Based on available info, **a major source of PM2.5 emissions is most consistent with combustion of solid fuels for heating and/or cooking**, while vehicular emissions may be secondary (however, this needs to be analyzed further)
- Almaty could **consider designing a parallel program to the LEZ to incentivize reducing solid fuel consumption or shifting to cleaner solid fuels in the winter**
- In districts where central heating and/or gas is available, for example, **solid fuel burning could be banned initially on high pollution days or phased out completely**

Where to implement restrictions to improve air quality

- Unlike PM2.5, which can be regional and have varied sources in a city, **NO2 is more a localized pollutant that is primarily from vehicular combustion in urban areas**
- From the Clarity network analysis, the highest average NO2 concentrations were measured in the **Districts of Almalinsky and Auzovsky**
- Using Google traffic data provided by Almaty, **these Districts (and northern end of District of Bostandiksky**) also experience relatively **more congestion during commuting hours** as compared to other districts
- Based on these preliminary data, **neighborhoods within Districts of Almalinsky and Auzovsky could be appropriate locations to consider initial vehicular restrictions**

Where to implement restrictions to improve air quality

- Based on the existing pedestrian roads, bike baths, and metro stations in Almaty, **the area around the north-south section of the metro line is a candidate for either temporary or permanent vehicular restrictions**
- Other possible areas are **segments along the east-west metro corridor,** but additional pedestrian or biking infrastructure may be necessary to support vehicular restrictions as those resources do not seem to be as dense
- **These are a preliminary assessments** and need to be further refined based on green space, key commercial areas, bus routes, and actual pedestrian and vehicular traffic



Thank you for your attention!