The CAREC Region's Transition to Advanced Technologies and the Role of Foreign Trade, Foreign Firm Engagement, and Industrial Policies

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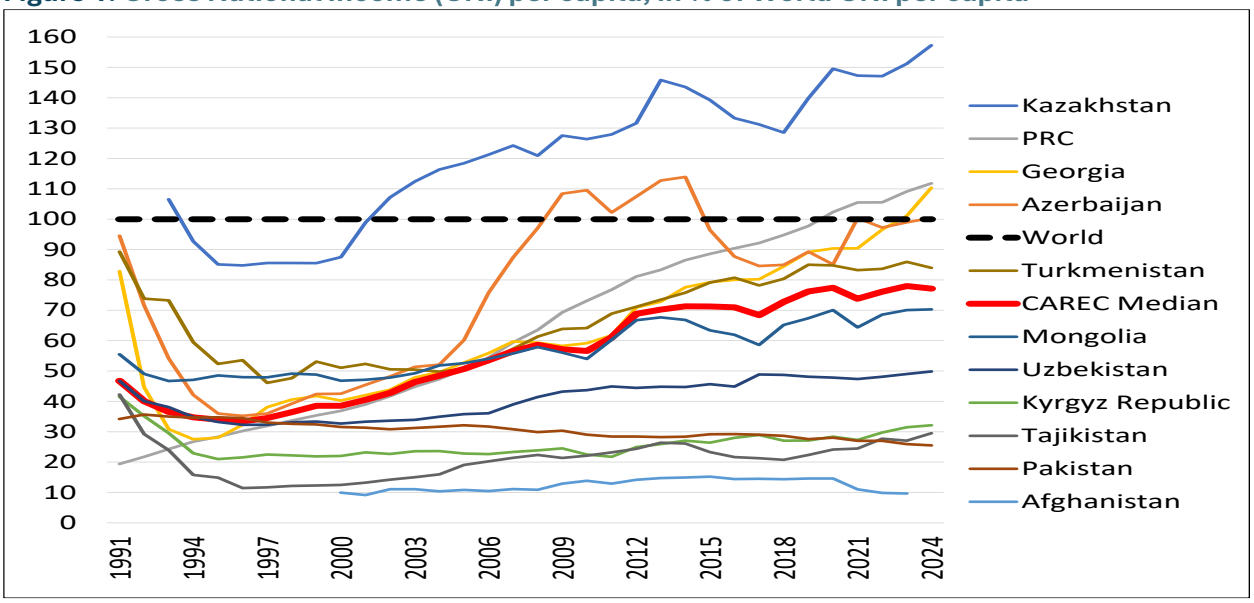
Introduction

The CAREC region has remarkably developed over the last three decades and achieved high economic growth. As a result, the median of CAREC[1] members' gross national income (GNI) per capita rose from a low of 33.4% of the World's GNI per capita in 1996 to as much as 77.1% in 2024 (Figure 1). By 2024, Kazakhstan, the PRC, Georgia, and Azerbaijan all had a higher GNI per capita than the World on average. The largest increases between 1996 and 2024 were accomplished by the PRC (82 percentage points), followed by Georgia (78 p.p.), Kazakhstan (72 p.p.), and Azerbaijan (65 p.p.), Turkmenistan (30 p.p.), Mongolia (22 p.p.), Tajikistan (18 p.p.), and Uzbekistan (18 p.p.).

Figure 1: Gross National Income (GNI) per capita, in % of World GNI per capita



Source: World Bank, World Development Indicators, author's calculations

Now, the intensifying global technological revolution with decarbonization, new electrification, and artificial intelligence at the core requires a substantial shift in the CAREC region's industrial operations. The region must embrace the arising new opportunities and deal with the new challenges. A critical role for the transition play external trade, the engagement of leading foreign companies, and industrial policies. In the following the report discusses phases of the CAREC region's GDP and gross national income per capita growth over the last three decades, then tries to shed some light on the state and prospects of the region's foreign trade, electrification and digitalization/AI efforts, and on foreign direct investment/foreign firm engagement. Finally, it looks at the region's industrial policies and concludes that a more decisive shift towards promoting advanced

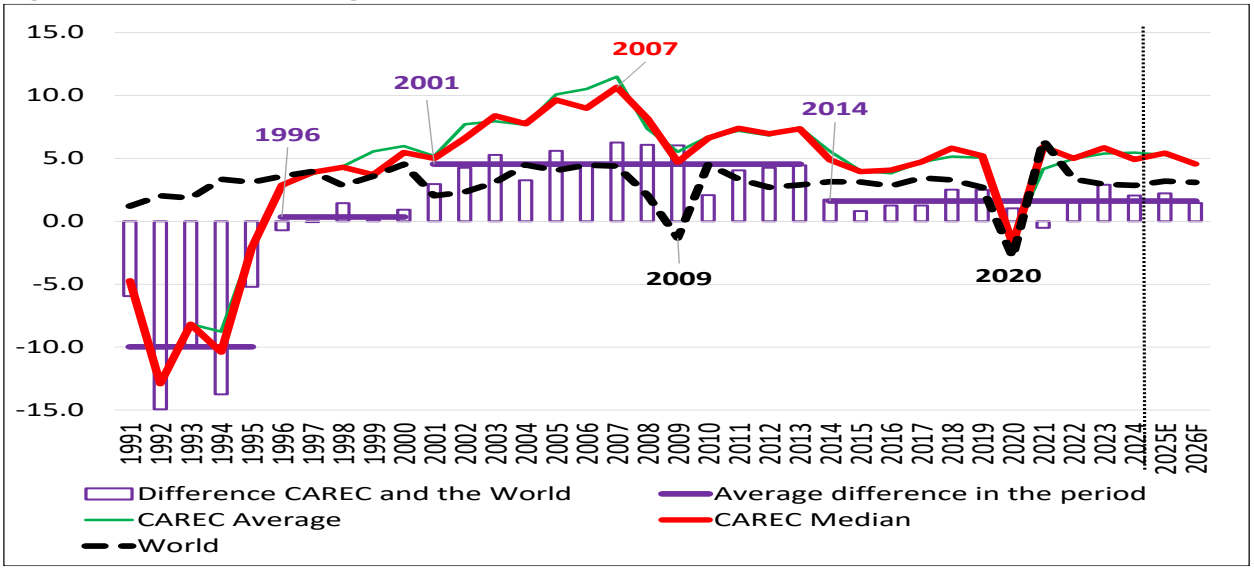
[1] The Central Asian regional economic cooperation (CAREC) region: Afghanistan, Azerbaijan, PRC, Georgia, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, Uzbekistan

technologies[2] instead of defending the older sectors/structures is required but that many promising initiatives are already under way.

The CAREC region's several phases of economic growth

Four basic phases of CAREC growth can be distinguished since the early 1990ies: recession; alignment with global growth; substantially faster than global growth; maturing and some slowing down but still somewhat faster growth than globally. a) The dissolution of the Soviet Union in 1991, which had a major impact on many of the CAREC economies, was followed by a deep recession (Figure 2). b) After overcoming the recession, median CAREC real GDP growth roughly equaled World growth during 1996-2000. c) Then, median CAREC growth further accelerated, reaching a peak in 2007 and achieving a 4.5 p.p. higher than World growth on average in the 2001-2013 period. The great financial crisis of 2008-2009 caused a substantial reduction in growth also in the CAREC region, but not as much as globally. d) After 2013 the growth difference in the median between the CAREC region and the World diminished, but the CAREC region continued to grow faster.

Figure 2: Annual real GDP growth, %



Source: World Bank, World Development Indicators, author's calculations

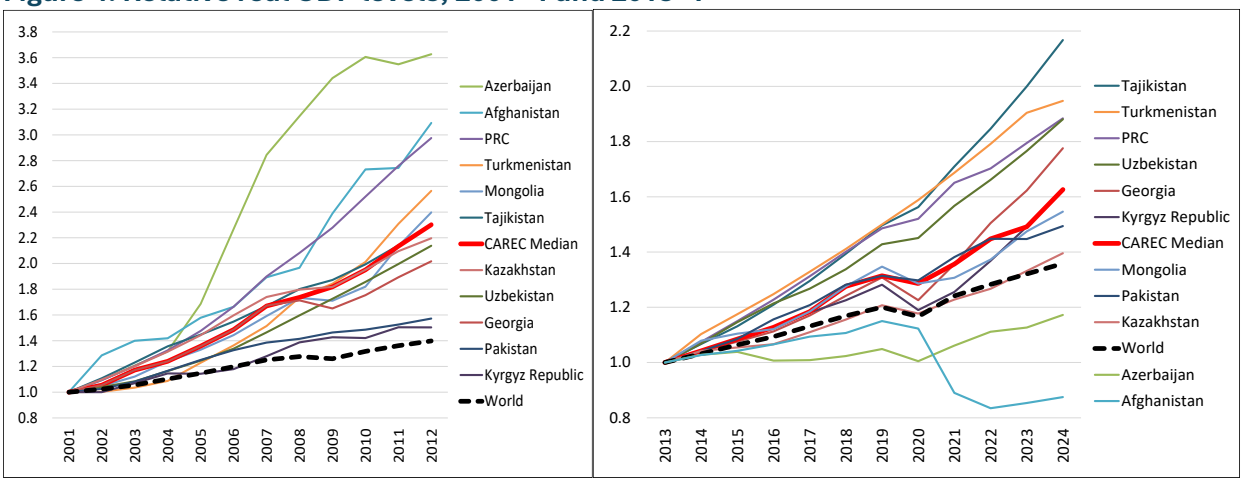
[2] Advanced technologies can be defined as those with high innovation and technology intensity and those enabling sustainability and green transition. Key sectors are digital economy & Information technologies (AI, big data, cloud, IoT, industrial internet, digitalization), high-tech manufacturing (automation, smart supply-chains), new energy/green energy/clean-Tech (renewable energy, energy storage, green energy solutions), electric vehicles (EVs), batteries, "future industries" (e.g. biotech / biomanufacturing, new materials, high-end equipment, advanced electronics), tech-intensive services (including digital finance, e-commerce). The report specifically focuses on decarbonization and digitalization/AI.

Figure 3: Commodity prices: oil (Brent), copper and gold

The CAREC region's growth dynamics significantly changed between 2014-2024 and a decade earlier. Lower global fossil fuel prices (Figure 3) substantially slowed oil and coal exporters' real GDP growth in the 2014-2024 period compared to the decade before (Figure 4). Other factors such as economic maturing also played a role; all CAREC economies except for the Kyrgyz Republic recorded some deceleration as a result.[3] The CAREC median real GDP level was about 2.3 times higher in 2012 than in 2001. Over the same number of years, between 2013 and 2024, it was only about 1.6 times higher. However, growth remained decent and almost all CAREC economies achieved higher than global growth also in the 2014-2024 period. Global GDP was roughly 1.4 times higher than 11 years earlier in both periods.

[3] However, copper and gold prices have become strongly supportive since 2024 and especially 2025, opening big opportunities for gold producers such as the Kyrgyz Republic and Uzbekistan and copper producers such as Mongolia and also Kazakhstan.

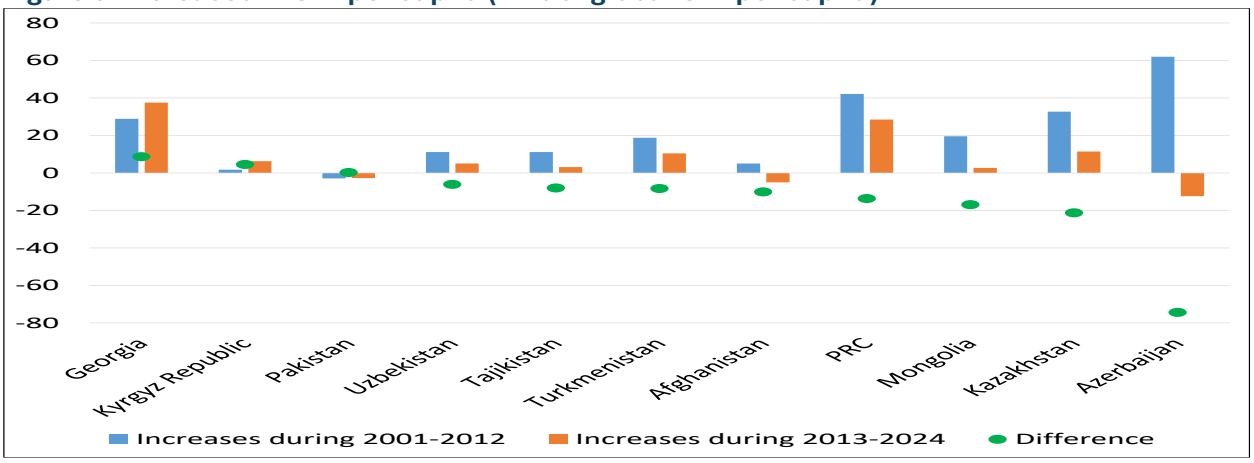
Figure 4: Relative real GDP levels, 2001=1 and 2013=1



Note: The country names appear in the legend aligned with the line order respectively in 2012 and 2024
Source: World Bank, World Development Indicators, author's calculations

The diminished difference between CAREC and global growth also reduced increases in GNI per capita in percent of the global GNI per capita. The largest slowdown had fossil fuel exporters Azerbaijan, Kazakhstan, Mongolia, and Turkmenistan (Figure 5). Georgia and the Kyrgyz Republic saw some acceleration.

Figure 5: Increases in GNI per capita (in % of global GNI per capita)



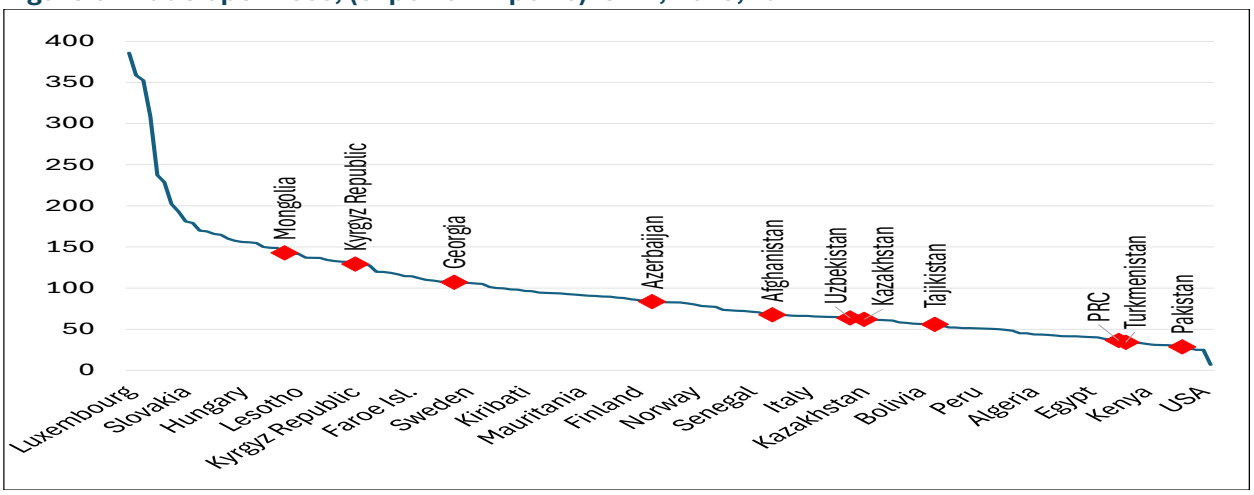
Source: World Bank, World Development Indicators, author's calculations

The CAREC region's foreign trade: large share of fossil fuel exports, but substantial potential for a major role in green supply chains

A major driver and enabler of the CAREC region's economic development has been foreign trade, both on the export side as a demand factor and on the import side as a provider of much-needed production equipment and consumer goods. Trade openness - that is exports plus imports over GDP -is higher than 50% for almost all CAREC economies (Figure 6). The trade openness of Mongolia, the Kyrgyz Republic, and Georgia exceeds 100%.

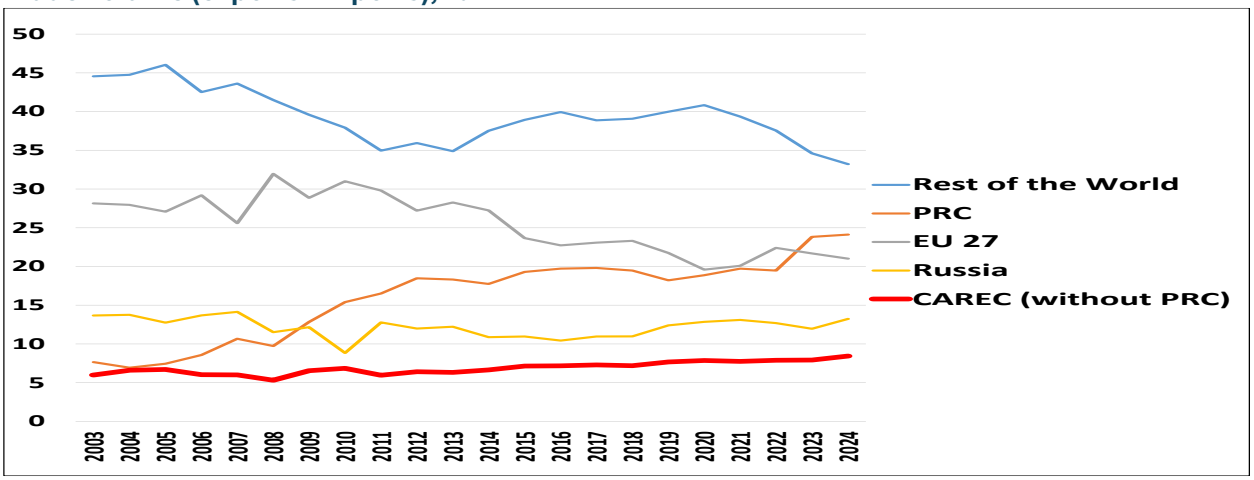
Larger economies such as the PRC and Pakistan trade more internally and therefore their trade openness is relatively lower than for smaller economies (but is still higher than for the USA, for example). The CAREC countries (other than the PRC[4]) exported more than USD 1 million to 157 countries in 2024 and imported more than USD 1 million from 150 countries. Main trading partners are the PRC, the EU, and Russia (Figure 7). They accounted together for 58.4% in 2024. The share of intra-CAREC rose to 8.4% in 2024, up from a low of 5.3% in 2008.

Figure 6: Trade openness, (exports+imports)/GDP, 2023, %



Note: The blue line represents all global countries here, the red diamonds the CAREC members
Source: Theglobaleconomy.com, author's calculations

Figure 7: Share in CAREC's (other than the PRC) foreign trade in goods; trade volume (exports+imports), %

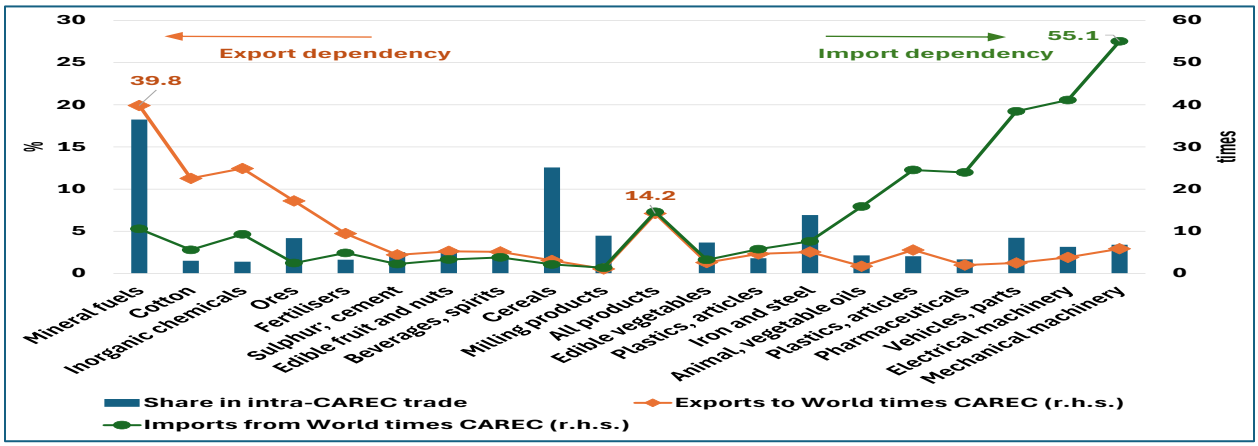


Source: TradeMap, author's calculations

[4] In the trade analysis the PRC dwarfs the other CAREC economies and is a league per se. Therefore the PRC is here mostly treated as a separate unit and not included in aggregate CAREC statistics.

Despite the increase in intra-CAREC trade, the region has remained highly dependent on the outside world. The CAREC region (other than the PRC) traded about 14 times more with the outside world than within the region in 2023 (Figure 8). While intra-CAREC trade is concentrated on cereals, iron-and-steel and on mineral fuels as well, it exported almost 40 times more in mineral fuels to the outside world than within CAREC (other than the PRC) and imported 40-55 times more machinery from the outside world than from within CAREC.

Figure 8: Intra-CAREC (other than the PRC) trade versus CAREC (other than the PRC) trade with the World, 2023

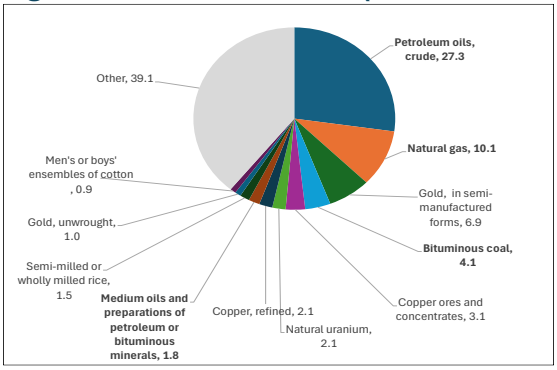


Note: by Harmonized System (HS) 2-digit product groups; the trade covered by the chart represents about 80% of the CAREC (other than the PRC) region's global trade.
Source: TradeMap, https://www.trademap.org/ , author's calculations

The strong export concentration on fossil fuels, which has been a substantial factor for the region's growth, is becoming a threat to region's economic future now. Fossil fuels accounted for more than 43% of the region's total exports in 2024 (Figure 9). Decarbonization initiatives in international trade such as the EU's Carbon Border Adjustment Mechanism (CBAM) that will impose tariffs on the embedded carbon in imported products after 1 January 2026, and the PRC's national emissions trading system (ETS), launched in 2021 and envisaged to be tightened in 2026, underline the importance of the CAREC region's preparation for the evolving international low-carbon environment. Further development of intra-CAREC trade is important for the region's prosperity but given the high extra-regional export-dependence on fossil fuels, it will likely remain too low to substantially mitigate the impact of the EU's and PRC's decarbonization efforts[5]. However, at the same time decarbonization and digitalization open new opportunities that could serve as substitutes for fossil fuel exports.

[5] While intra-CAREC trade will not be able to shield the region from EU/PRC decarbonization efforts, CAREC cooperation, cross-country investment, and technology transfer can help to scale up production in sectors highly important for global decarbonization and electrification such as metal mining and metal production. Cross-country grid connectivity is another field of high importance.

Figure 9: Share in CAREC's (other than the PRC) overall exports, 2024, %



Source: TradeMap, https://www.trademap.org/ , author's calculations

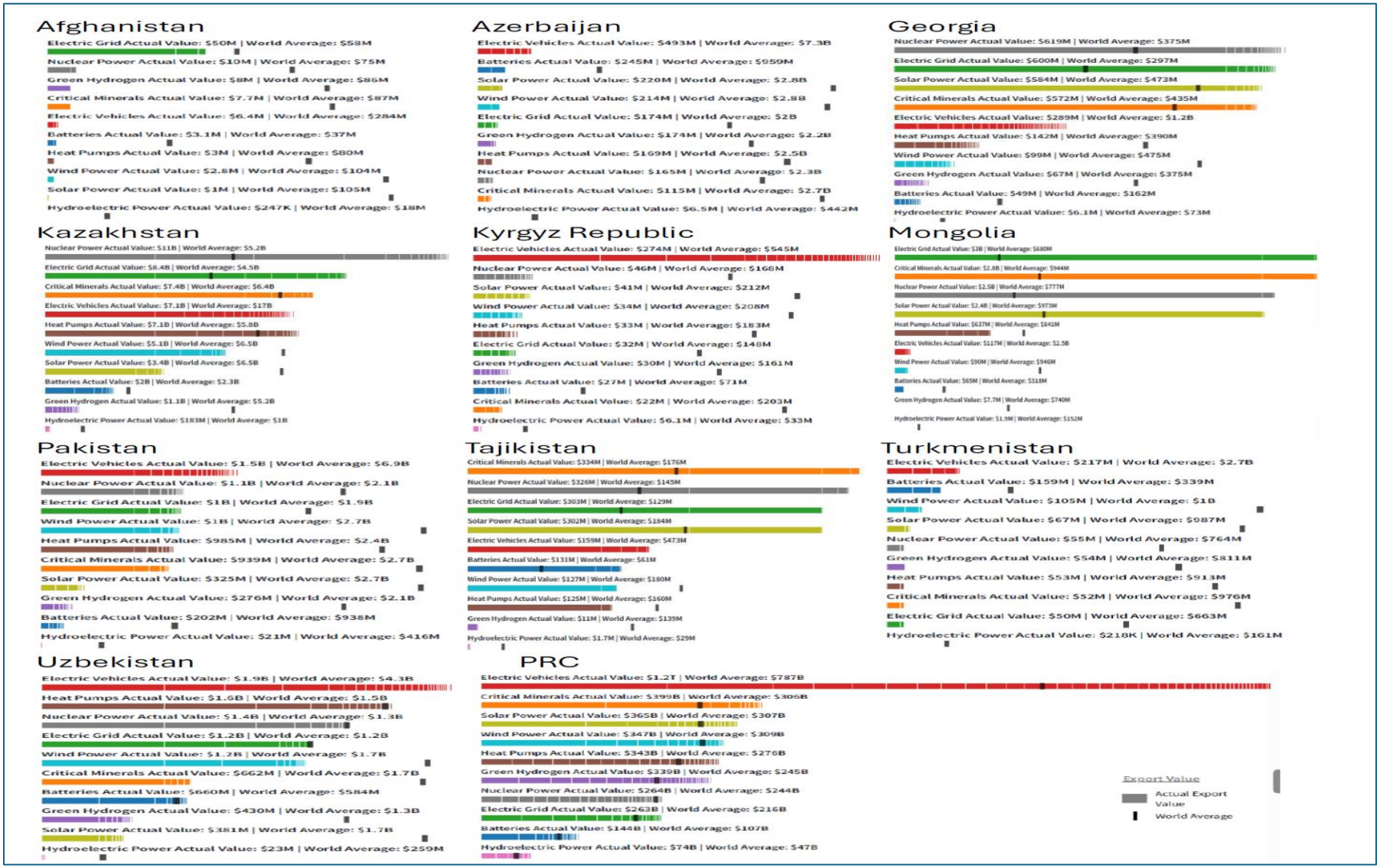
Table 1: Critical minerals exports by selected CAREC economies in 2023, USD thousand

	Azerbaijan	PRC	Georgia	Kazakhstan	Kyrgyz Republic	Pakistan
Aluminum	166,512	19,139,638	38,245	533,776	8,563	74,856
Aluminum; Bauxite	0	1,830,169	9	361,933	2	236
Arsenic	0	6,163	0	0	0	0
Borates	0	42,887	0	518	0	14
Cadmium	0	9,636	0	6,688	0	0
Chromium	1	190,320	0	245,881	0	126,552
Cobalt	0	300,535	0	46	22	0
Copper	50,189	9,103,078	512,806	6,357,101	114,404	782,820
Fluorspar	0	167,228	0	4,357	0	13,719
Gallium ; Vanadium ; Indium ; Niobium ; Germanium	0	430,701	0	214	0	0
Generating sets; wind-powered	0	699,344	0	0	0	161
Graphite	0	285,471	0	0	0	47
Lead	14,599	457,704	11,771	198,524	10,490	39,739
Light emitting diodes LED""	0	3,232,626	0	3,003	5	7
Lithium	238	72,437,148	308	20,099	4,334	2,094
Magnesium	1	2,221,174	5	183	0	1,382
Manganese	0	898,746	19,516	11,157	92	194
Molybdenum	0	1,129,675	0	143,552	0	42
Nickel	9	2,762,657	90	13,037	1,190	448
Niobium	0	444,402	0	60,361	10	1
Platinum Group Metals (PGMs)	19	103,552	85	724	0	95,370
Rare Earth Elements	0	763,149	0	6,895	0	0
Selenium	0	5,248	0	1,163	0	0
Silicon	0	2,587,647	0	1,187	185	4,593
Tin	0	397,923	0	63	3,082	27
Titanium	1	994,830	93	177,849	25	1
Vanadium; Niobium	0	233,909	0	523	0	0
Zinc	843	74,780	31	1,031,269	39	7,718
Zirconium	0	52,034	0	35,944	0	0

Source: Trade in Critical Minerals, https://critmin.org/ , author's calculations

The CAREC region already successfully produces and exports materials necessary for global decarbonization and the imminent new wave of electrification. Copper ore and refined copper accounted together for more than 5% of the CAREC region's (other than the PRC) exports in 2024. And the CAREC region - even besides the PRC - is a major supplier of critical minerals already (Table 1) and is currently signing new agreements with major powers such as the US and the EU, which will boost exports further.

Figure 10: Revealed Comparative Advantages in Green Value Chains, 2022



Source: Growth Lab at Harvard University. “Greenplexity." Web application. Harvard Kennedy School, 2025. https://growthlab.app/greenplexity, combined by the author

Several CAREC economies have revealed comparative advantages (RCA) in green supply chains. Balassa Index[6] values of higher than 1 indicate comparative advantages in supply chains related to critical minerals for Georgia, Kazakhstan, Mongolia, Tajikistan, and the PRC, related to the electric grid for Georgia, Kazakhstan, Mongolia, Tajikistan, and the PRC, to solar power for Georgia, Mongolia, Tajikistan, and the PRC, to nuclear power for Georgia, Kazakhstan, Mongolia, and Tajikistan, and related to heat pumps for Kazakhstan (Figure 10). The PRC shows Balassa Index values higher than 1 for all supply chains mentioned in Figure 10.

While there are already revealed comparative advantages in green supply chains, the potential is much bigger. Central Asia's share in global critical minerals reserves is 38.6% for manganese ore, 30.1% for chromium, 20% for lead, 12.6% for zinc, 8.7% for titanium, 5.8% for aluminum, 5.3% for copper, 5.3% for cobalt, and 5.2% for molybdenum.[7] There is a large renewable energy potential in the CAREC region, especially solar photo voltaic (Table 2)[8]. At the same time electricity accounted only for 0.3% of total CAREC's (other than the PRC) exports in 2024. The CAREC region's resource endowments constitute an unexploited potential for participating in battery and electric vehicles production and even for localizing such production, if appropriate infrastructure, talent, and investment climate are provided.

Table 2: Realizable technical potential for RE deployment in selected countries (MW)

	Georgia	Azerbaijan	Kazakhstan	Kyrgyz Republic	Tajikistan	Turkmenistan	Uzbekistan
Small hydro	4,500	400	4,800	1,800	23,000	1,300	1,800
Wind	2,300	4,500	354,000	1,500	2,000	10,000	1,600
Solar PV	96,900	115,200	3,760,000	267,000	195,000	655,000	593,000
Biomass	1,700	1,500	300	200	300	-	800

Source: Compiled based on UNDP "Renewable Energy Snapshot for respective Central Asian countries"[9].

[6] $$\text{Balassa Index} = \frac{(\text{Country's Export of Product X})}{(\text{Country's Total Exports})} \div \frac{(\text{World's Export of Product X})}{(\text{World's Total Exports})}$$

The world average of exports in Figure 10 indicates the level of exports a country would have if it exported goods in the same proportion as its overall share of global trade, that is the Balassa index is set to =1.

[7] Indra Overland, Roman Vakulchuk, "Central Asia is a missing link in analyses of critical materials for the global clean energy transition", 2021, https://www.nupi.no/en/publications/cristin-pub/central-asia-is-a-missing-link-in-analyses-of-critical-materials-for-the-global-clean-energy-transition2

[8] For a more detailed analysis of the renewables potential have a look the CAREC Institutes recent report "Renewable Investment Ecosystem in Central Asia", https://www.carecinstitute.org/publications/carec-institute-releases-report-on-renewable-energy-investment-in-central-asia/

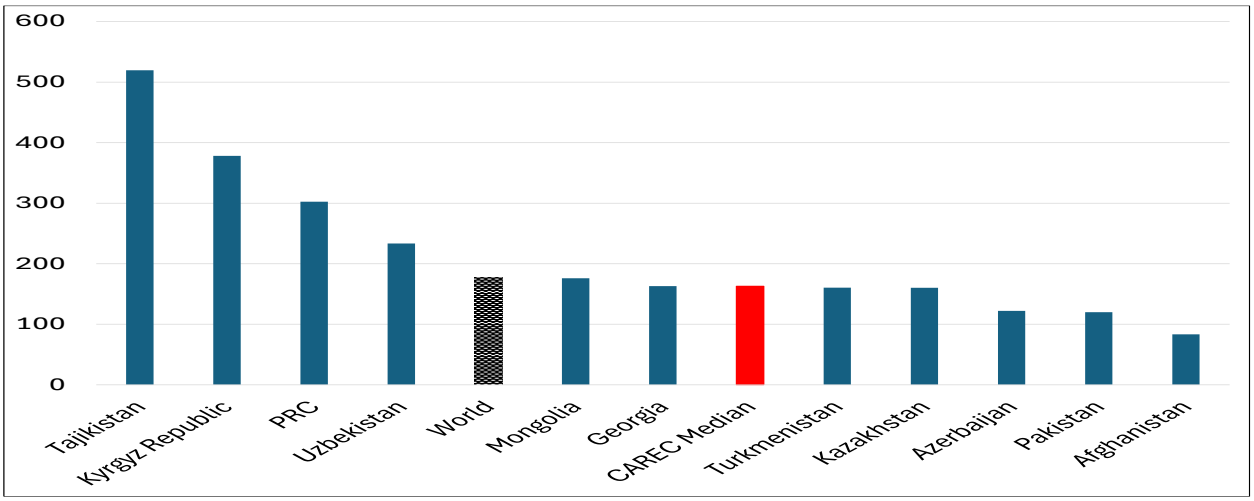
[9] Retrieved from https://www.eurasia.undp.org/content/rbec/en/home/library/environment_energy/renewable-energy-snapshots.html

The CAREC region's new wave of electrification: intensifying fast - while more is needed to keep up with global growth

Electricity is a central ingredient of advanced production technologies. It links digitalization, green transition, and industrial transformation. More electricity is needed for the rapid development of e-mobility, the electrification of processes that traditionally relied on coal or gas such as steel and cement, and for the transition to greener buildings through electrified heating/cooling, heat pumps, smart appliances, etc. Data centers, AI computation, 5G/6G networks, and robotics all run on electricity. Regional or even trans-continental power grids and cross-border electricity trade are crucial for connecting electricity consumers and generators. At the same time electricity systems are becoming decentralized: households, firms, and cities both consume and produce. Smart grids integrate distributed generation such as rooftop solar, microgrids, EV batteries into national and regional systems.

Several CAREC economies use more electricity per unit GDP than is the case globally. Tajikistan, the Kyrgyz Republic, the PRC, and Uzbekistan are more electrified than the World in total by this measure (Figure 11). Mongolia, Georgia, Turkmenistan, and Kazakhstan are roughly in line with the global figure, Azerbaijan, Pakistan, and Afghanistan have still to catch up somewhat. While the measure of electricity usage per GDP is only a rough one due to potentially inefficient use of electricity, it provides a broad view of which countries of the region are already more on the electricity side, and which ones have an even more challenging transformation in front of them.

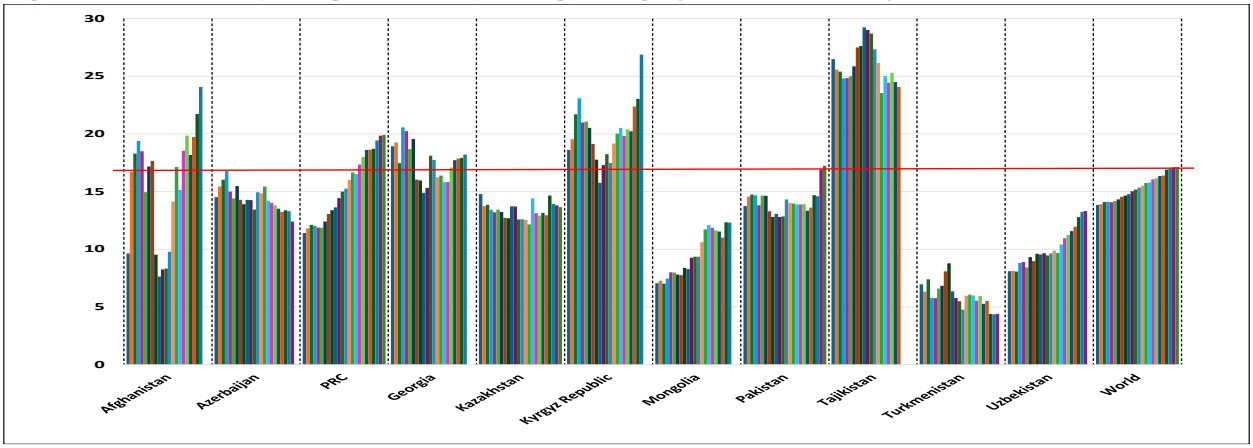
Figure 11: Electricity usage per GDP (Wh/GDP at PPP, constant 2021 international $), 2023 or latest



Source: Our World in Data https://ourworldindata.org/ , World Development Indicators https://databank.worldbank.org/source/world-development-indicators , author's calculations

In several CAREC countries the ratio of electricity usage to primary energy (fossil fuels, nuclear, hydro and other renewables) usage rose substantially, reflecting progress in electrification. Afghanistan, the PRC, Georgia, and most pronounced the Kyrgyz Republic and Tajikistan use meanwhile a significantly higher ratio of electricity compared to primary energy than the World on average, even though the World as a whole has advanced as well (Figure 12). Turkmenistan and Mongolia have remained substantially below the global average, but Mongolia has begun to catch up.

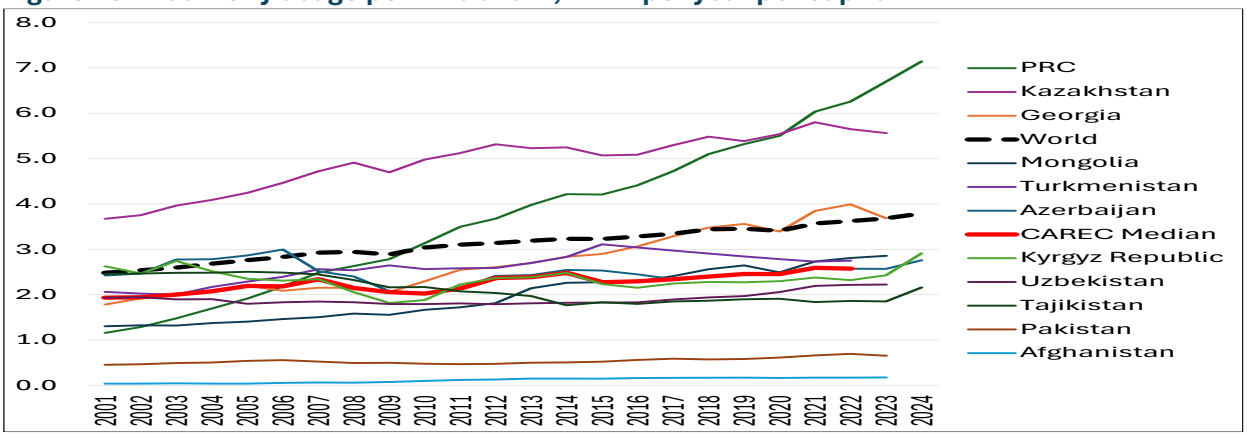
Figure 12: Electricity usage / Primary energy usage (2001 to 2023, %)



Source: Our World in Data https://ourworldindata.org/ , author's calculations

Usage of electricity per capita has nevertheless remained significantly below the global indicator in most CAREC countries. Further development will require substantially more electricity. The PRC and Kazakhstan already use more electricity per inhabitant than the World in total, Georgia is roughly in line, but the other CAREC economies use less, Pakistan and Afghanistan substantially less (Figure 13).

Figure 13: Electricity usage per inhabitant, MWh per year per capita



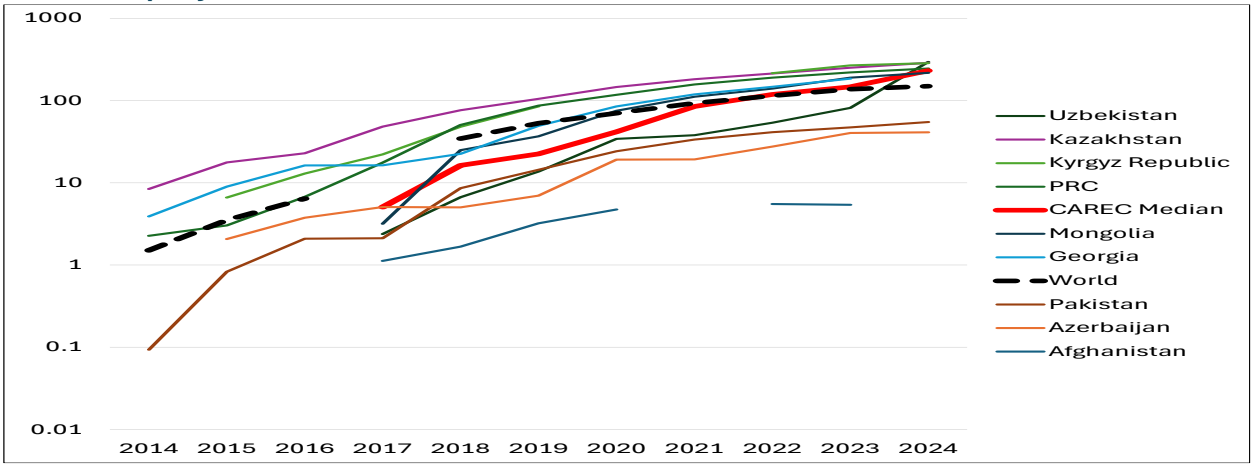
Note: The country names appear in the legend aligned with the line order respectively in 2012 and 2024

Source: Our World in Data https://ourworldindata.org/ , World Development Indicators https://databank.worldbank.org/source/world-development-indicators , author's calculations

The CAREC region's digitalization: sharp increase in data traffic while AI-preparedness substantially differs across the region

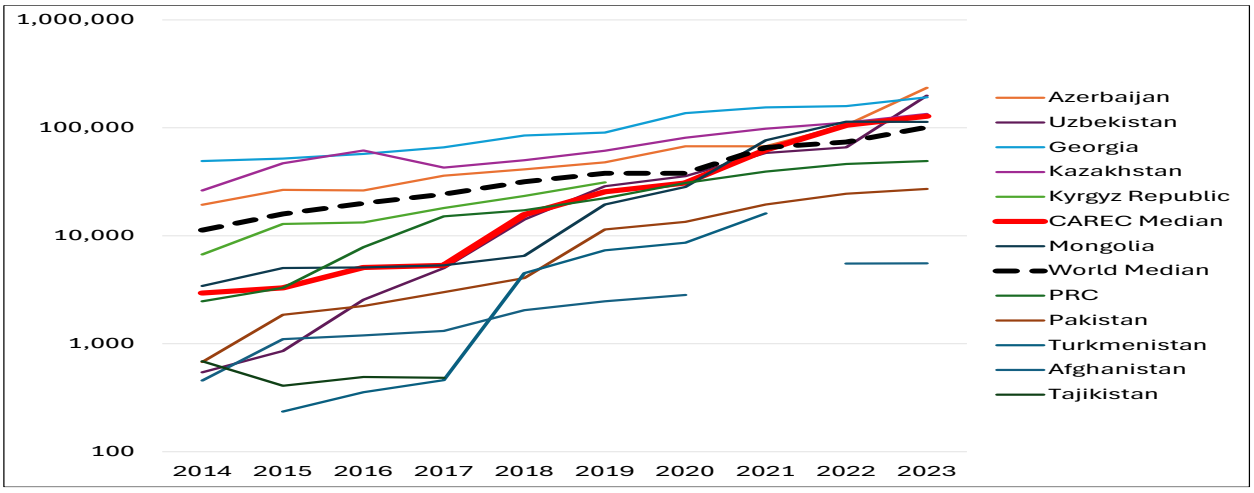
Data generation and traffic rise fast and deeply transform the global economy now. This boosts productivity, crucial also for the CAREC region's further fast GDP and GNI per capita growth. CAREC region's median growth both in domestic and in international data traffic was faster than global growth and most CAREC members exceed the global per capita data traffic indicator now (Figures 14 and 15). Uzbekistan, Kazakhstan, the Kyrgyz Republic, the PRC, Mongolia, and Georgia all had higher domestic per capita traffic than the World on average in 2024. Azerbaijan, Uzbekistan, Georgia, Kazakhstan, the Kyrgyz Republic, and Mongolia had higher international traffic than the World on average.

Figure 14: Mobile-broadband Internet traff (within the country), logarithmic scale, gigabytes per inhabitant per year



Source: International Telecommunication Union https://www.itu.int/ , author's calculations

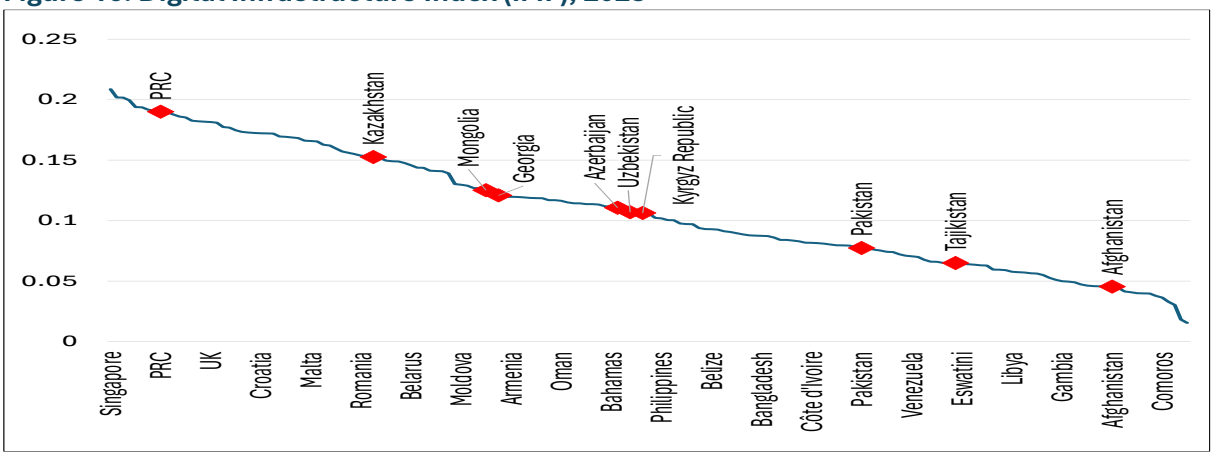
Figure 15: International bandwidth usage per inhabitant, logarithmic scale, megabits per second



Source: International Telecommunication Union https://www.itu.int/ , author's calculations

While data traffic has risen fast in all CAREC members, the development of digital infrastructure has remained quite dispersed over the global spectrum, which might become a bottleneck for further fast progress. The PRC is at the global digital infrastructure forefront, most other CAREC economies are in the middle, but Afghanistan lags substantially, and Tajikistan and Pakistan, also need to catch up (Figure 16).

Figure 16: Digital Infrastructure Index (IMF), 2023



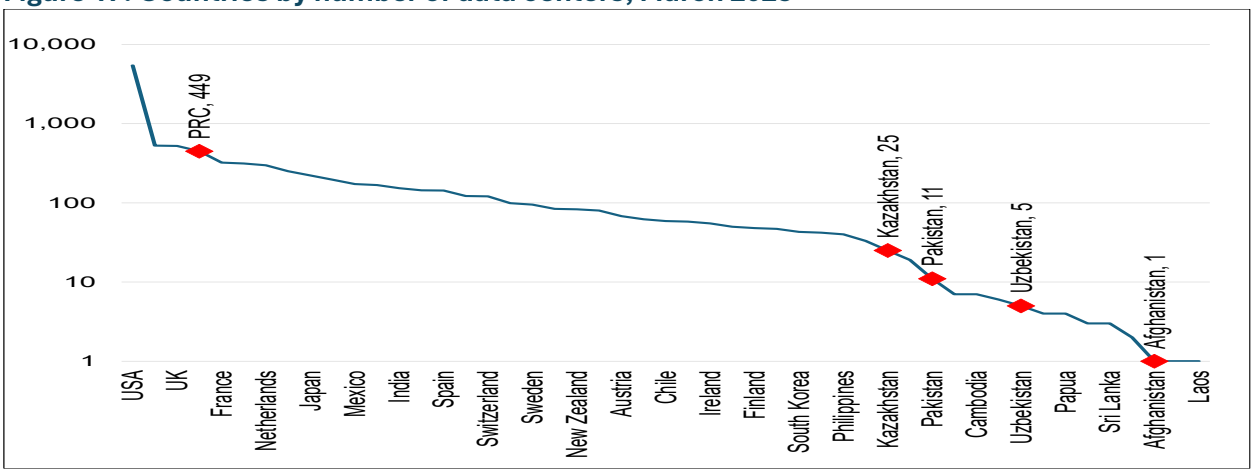
Source: IMF https://www.imf.org/external/datamapper/datasets/AIPI , author's calculations

However, several CAREC members have already built data centers, and are in the process of building more. Data centers, fiber networks, and satellites constitute the new digital-industrial infrastructure. They enable AI training, cloud computing, fintech, e-commerce, and smart manufacturing. Data centers concentrate in regions with cheap and stable electricity, which provides chances for the CAREC region, if its electrification proceeds successfully further. The PRC has already 449 data centers, Kazakhstan, Pakistan, and Uzbekistan have also some, and even Afghanistan has one center (Figure 17).

Several CAREC countries have announced plans or are building new large data centers. Among them are: Azerbaijan via AzInTelecom; Kazakhstan with Akashi + during President Tokayev's visit to Beijing in September 2025, Kazakhtelecom and China Energy Overseas Investment signed an agreement to build a 100 MW data center; Pakistan plans a hyperscale facility via NASTP & Khazana Cloud / Huawei; Uzbekistan through Saudi DataVolt in Tashkent, Bukhara, New Tashkent.[10]

[10] Sources: https://azintelecom.az/ru/news/azerbaycanda-yasil-texnologiyalar-esasinda-iki-yeni-data-merkezi-tikilecek/ ; https://astanatimes.com/2025/09/kazakhstan-china-to-build-advanced-green-data-center/ ; https://www.datacenterdynamics.com/en/news/khazana-cloud-and-nastp-plan-pakistans-first-hyperscale-data-center/ ; https://developingtelecoms.com/telecom-technology/data-centres-networks/16702-saudi-s-datavolt-to-invest-in-data-centres-across-uzbekistan.html

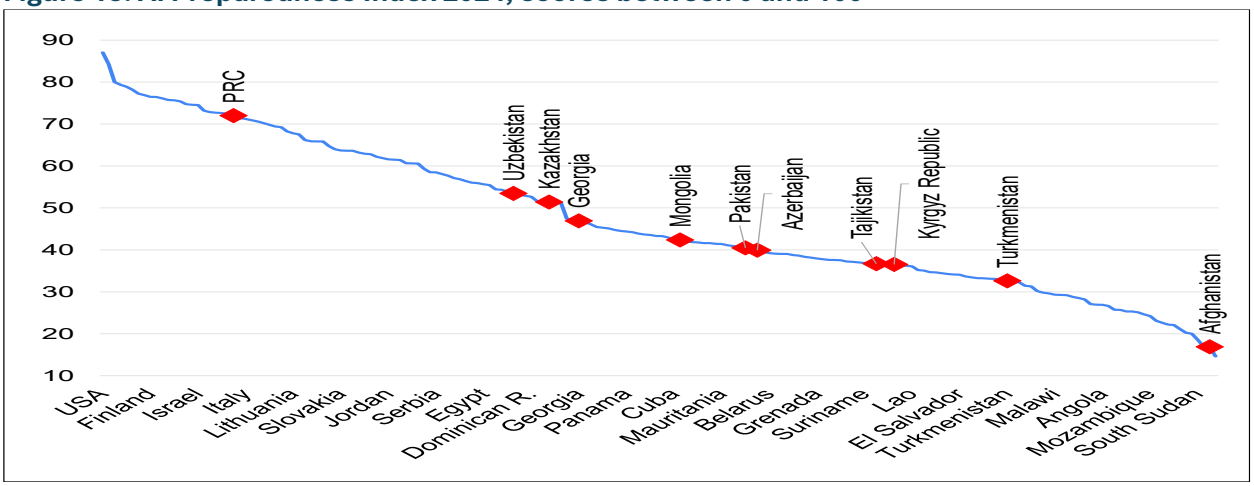
Figure 17: Countries by number of data centers, March 2025



Source: Statista https://www.statista.com/ , author's calculations

AI preparedness also differs quite substantially among CAREC members. The PRC is at the forefront again, Uzbekistan, Kazakhstan, Georgia are in the advanced middle, Mongolia, Pakistan, and Azerbaijan in the middle proper, other CAREC members still need to catch up more, and Afghanistan has fallen behind (Figure 18).

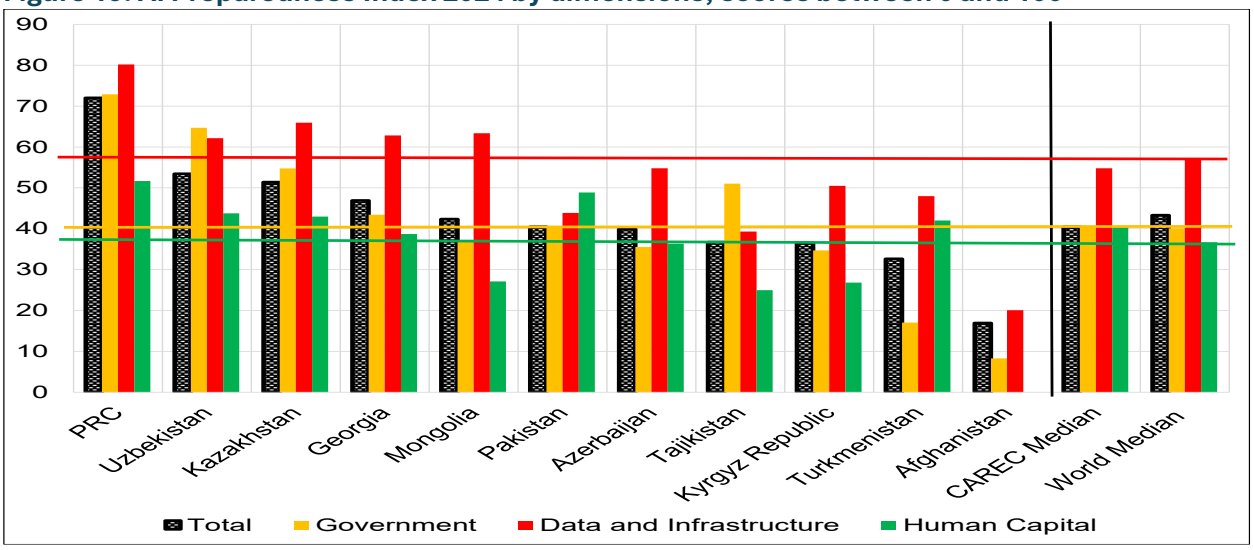
Figure 18: AI Preparedness Index 2024, scores between 0 and 100



Source: Oxford insights https://oxfordinsights.com/ai-readiness/ai-readiness-index , author's calculations

By dimensions, CAREC members generally exceed the World indicator for the preparation of human capital but fall somewhat short in infrastructure. The PRC, Uzbekistan, Kazakhstan, and Georgia surpass the global indicator in all dimensions mentioned in Figure 19, Mongolia in infrastructure, Pakistan and Turkmenistan in human capital, Tajikistan in government. However, infrastructure is globally the most advanced factor of AI preparedness and human capital the least advanced; CAREC members thus also have mostly the largest needs in human capital and government preparation.

Figure 19: AI Preparedness Index 2024 by dimensions, scores between 0 and 100



Note: The horizontal lines represent the World Median values

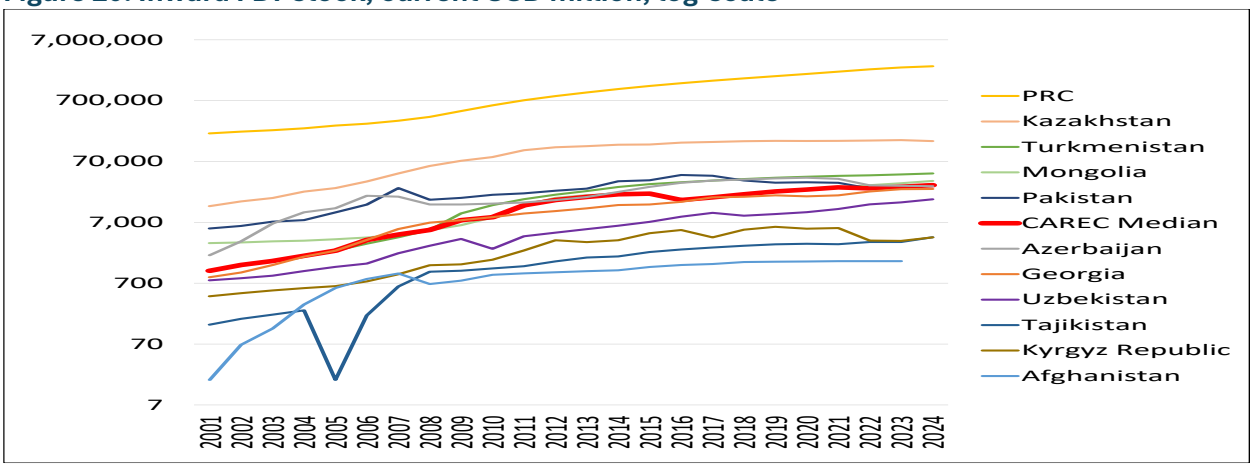
Source: Oxford insights https://oxfordinsights.com/ai-readiness/ai-readiness-index , author's calculations

Foreign firms' engagement: still a lot in oil and gas but many initiatives in advanced-technology related sectors

A major driver and enabler of the CAREC region's economic and technological progress has been the engagement of foreign firms, both via foreign direct investment and via specific projects. The region's inward foreign direct investment (FDI) stock[11] has steadily increased since 2001 (Figure 20). The PRC's inward FDI stock rose from USD 203 billion in 2001 to USD 2,568 billion in 2024. Kazakhstan's stock rose tenfold from USD 15 bn to USD 151 bn. Turkmenistan's stock increased from USD 1 bn to USD 45 bn, Mongolia's from USD 3 bn to USD 33 bn, Pakistan's from USD 6 bn to USD 30 bn, Georgia's from USD 1 bn to USD 25 bn, thus the inward FDI stock of all these countries is USD 25 million or higher now. Uzbekistan's stock rose specifically fast after its opening and reached USD 17 bn, up from USD 1 bn in 2001. The Kyrgyz Republic's and Tajikistan's stock is not as high, but also each rose from USD 1 bn in 2001 to USD 4 bn in 2024, Afghanistan's increased from USD 1 bn to USD 2 bn.

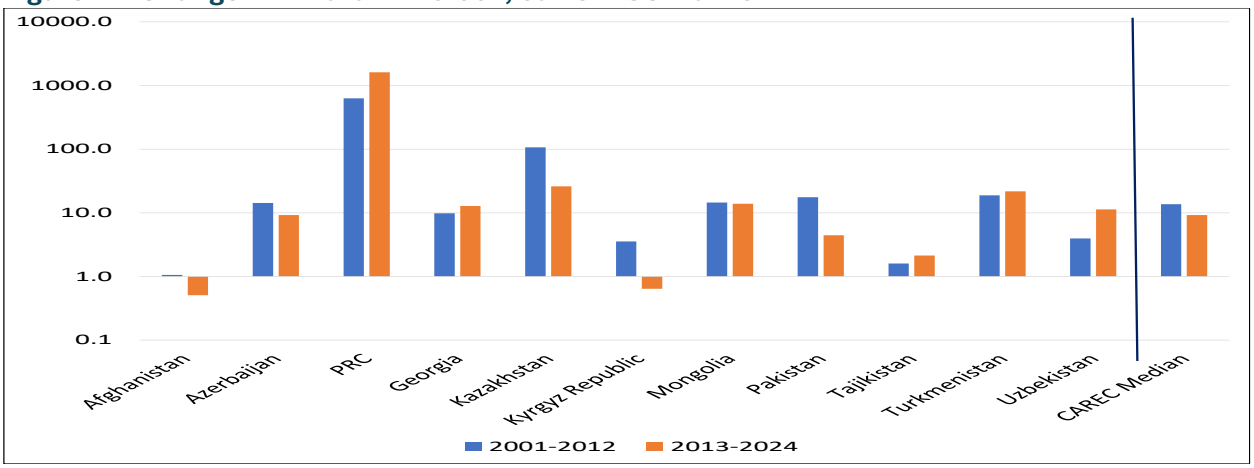
[11] That is the cumulated all-period net foreign direct investment inflows

Figure 20: Inward FDI-stock, current USD million, log-scale



Source: UNCTADStat https://unctadstat.unctad.org/ , author's calculations

Figure 21: Change in Inward FDI-stock, current USD billion



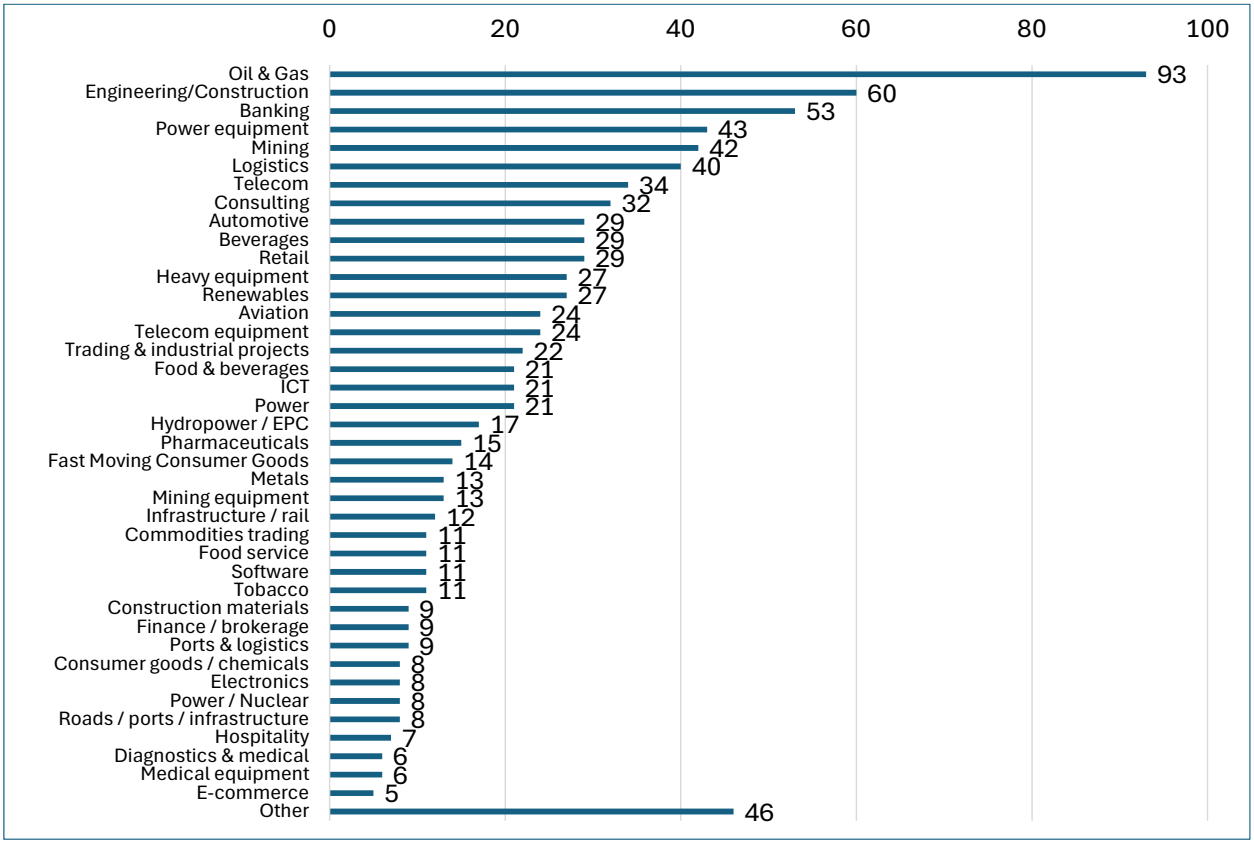
Source: UNCTADStat https://unctadstat.unctad.org/ , author's calculations

FDI dynamics somewhat changed between the 2001-2012 and the 2013-2024 periods. Net FDI in the oil countries Azerbaijan and Kazakhstan were lower in the later period than in the earlier one (Figure 21). While the slowdown can be partially explained by maturing and investment cycles, longer-term oil prospects most likely play a role as well. Pakistan had also lower inflows, probably related to the economic issues reflected in the IMF stand-by programs. Afghanistan saw net outflows after Taliban takeover, the Kyrgyz Republic related to the Kumtor goldmine nationalization as Kumtor intra-firm loans were repaid. However, other economies saw even higher inflows in the later period most notably Uzbekistan.

While FDI and engagement of foreign firms in the CAREC region (other than the PRC) spread over many sectors, the largest number still focus on the oil and gas sector, resembling the concentration on this sector in foreign trade. More than 10 percent of engagements (93 engagements) according to the methodology of Figure 22 are still in the oil and gas sector. However, engineering/construction, power equipment, mining (other than oil

and gas), telecom, and automotive are also well represented, which provides a good basis for innovation and advanced technologies.

Figure 22: Engagement of major foreign firms in the CAREC region (other than the PRC) by sector*



* Number of firms times the number of CAREC countries in which they were engaged, active in 2024-2025
Source: Retrieved by the author from multiple media news with the help of AI

And there are indeed already many projects in advanced technology sectors such as renewables, critical minerals, EVs, digitalization and AI. Firms, which engage with one country of the CAREC region, often continue to engage with others and become regional actors (Table 4 in the annex). Examples include Masdar, ACWA Power, Total Energies, China Gezhouba Group, PowerChina, which are all engaged in renewable in three or more CAREC countries.

A focal point of the EU, the US, and other countries for their engagement with Central Asia and the broader CAREC region have become critical minerals. Most foreign firm operations in the CAREC regions (other than the PRC) are still related to copper and gold (Table 5 in the annex), but especially rare earths are of high interest now, and international companies are increasingly setting up links to mine them.

Another prominent advanced technology field, in which foreign firms are engaged in the CAREC region, is electric vehicles. Most prominently the PRC's BYD and CATL operate across the region, but companies from Europe, South Korea, Japan, the US, and Switzerland are also represented (Table 6 in the annex).

Foreign firm engagement with AI in the region has also taken off. Most of them listed in Table 7 of the annex are well-known IT/software companies. However, there is very likely also a whole ecosystem of not yet so well-known firms, which are not so much in the news, but engage in several aspects of AI-development, application, and education.

Some reorientation of the CAREC region's industrial policies towards advanced technologies might be required - and has begun to take place.

Industrial policy has made a revival globally since the great financial crisis (GFC) at latest, while motives have changed towards strategic competitiveness and climate change mitigation[12]. This holds to some extent also for the CAREC region, even though there were industrial policy attempts also earlier, e.g. Kazakhstan's "Forced Industrial and Innovative Development (FIIR)" plans 2010-2014 and 2015-2019 aimed at diversifying the economy away from reliance on raw material exports and promote sustainable growth. The PRC's 5-year plans also set industrial policy targets. CAREC members implemented both horizontal industrial policy measures such as measures for further improving the business and investment climate, and vertical ones for the support of specific industries. Table 3 gives an overview of the development of the frequency of vertical interventions, though probably missing some that were not so prominently covered by the media. In the last third of Table 3, that is in the years 2020-2025, a higher number of interventions took place than in the other two thirds, 62% for the PRC and 51% for CAREC other than the PRC.

[12] "…strategic competitiveness and climate change mitigation were predominant motives behind industrial policies following the GFC…", Evenett et al., Industrial Policy Since the Great Financial Crisis, IMF Working Paper, https://www.imf.org/en/Publications/WP/Issues/2025/10/31/Industrial-Policy-Since-the-Great-Financial-Crisis-570816

Table 3: Industrial policy interventions by year, number of interventions

Implementation year	PRC	CAREC other than the PRC
2008	88	3
2009	183	85
2010	229	49
2011	93	35
2012	219	398
2013	163	80
2014	219	150
2015	199	125
2016	903	190
2017	877	129
2018	299	194
2019	331	59
2020	283	495
2021	585	205
2022	561	630
2023	1,873	73
2024	1,788	101
2025	1,237	40
Total	*10,130*	*3,041*

Note: The database entries begin in 2008

Source: Global Trade Alert (GTA), GTA Data Center https://globaltradealert.org/, compiled by the author

CAREC members applied a broad range of industrial policy measures, with domestic subsidies and import barriers being the most prominent. In the PRC domestic subsidies accounted for 69.3 percent of the recorded interventions, import barriers for 17.5 percent (Table 8 in the annex). In the CAREC region other than the PRC domestic subsidies accounted for 16.4 percent and import barriers for 48.8 percent. For the CAREC region other than the PRC also export incentives played a significant role, they reached 20.1 percent of the total number of interventions. (For the PRC currently prominently also export controls on rare earth are a tool.)

While there are a significant number of interventions in sectors most strongly related to advanced technologies, interventions in traditional sectors dominate. In the 2008-2019 period covered by Global Trade Alert (GTA) data, 82.8 percent of interventions in the CAREC region (other than the PRC) were in rather traditional sectors, further increasing to 89.9 percent in 2020-2025 (Table 9 in the annex). The number of interventions in sectors more strongly related to advanced technology fell from 17.2 percent to 10.1 percent. The advanced technology sector figures for the PRC are substantially higher at 30.7 and 25.5 percent, respectively (Table 10 in the annex). However, there was also a reduction in the PRC's advanced technology share in 2020-2025 compared to the 2008-2019 period. The growth in the number of interventions amounted to 12.7 percent in the traditional sectors in the CAREC region other than the PRC, compared with a reduction in the number of interventions by 39.1 percent in the advanced sectors. The corresponding figures for the PRC are 78.9 percent growth in the traditional sector interventions, and 38.0 percent growth in the advanced sectors. Given that most interventions are subsidies or import barriers, *this leads to the conclusion that industrial policies are generally rather conservative/defensive, and perhaps some reorientation is needed.*

Fortunately, policy frameworks and major projects for promoting advanced technologies such as AI and renewables initiatives have been adopted across the CAREC region. AI frameworks were adopted or are in the process of being adopted more recently, renewables frameworks mostly already earlier. Within both areas more and more major projects are generated (Tables 11 and 12 in the annex provide examples). They will most likely result also in intensified progressive policy interventions, which in turn will generate more projects and policies.

To facilitate the CAREC region's ambitions for further fast economic growth and the transition to advanced technologies, FDI and foreign company engagement will continue to be a highly important factor. They facilitate technology transfer, help scaling up and specializing production, and open up opportunities in international supply chains. Table 13 in the annex shows that a multitude of horizontal measures have been adopted in 2020-2025, from tax incentives over privatization and facilitation of foreign exchange transactions to new rules in/for special economic zones.

Conclusions

While the CAREC region's growth difference to the World has narrowed but is still positive, new challenges and opportunities have come to the forefront. In-depth transformation and upgrading of services, industry, and agriculture towards the emerging advanced technologies have become a key force in promoting economic development.[13] Advances in AI, cloud computing, genetics, bio-manufacturing and beyond are transforming services, industry, and agriculture. Low-carbon technologies, the shift from fossil fuels to renewable energy, supported by new storage, and smart-grid systems are crucial for further development now, and for making economic growth sustainable.

To successfully seize the opportunities while living up to the challenges of industrial structure adjustment and upgrading, the CAREC region's governments and institutions must be active. They need to support the enhancing of technological innovation capabilities, training and attracting high-quality talents, and further improve the investment climate. Further intensifying regional and international cooperation, foreign trade, and making the best use of foreign investment will be key for achieving new elevated levels of production and prosperity in the region.

[13] "This year's laureates explain the period of sustained economic growth … fueled by the forces of innovation, disruptive on the microeconomic level but still consistent with sustained aggregate growth.", Scientific Background to the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2025; https://www.kva.se/app/uploads/2025/10/prize-economic-sciences-2025-scientific-background_8512bv0rnq.pdf

Industrial policies must be decisively oriented towards fostering advanced technologies. While there might be reasons to support traditional sectors for some time to help them adjust to the new realities without too fast, too painful, not manageable, not financeable disruptions, policies should not shield firms from competition indefinitely and include sunset clauses or clear benchmarks for ending support when objectives are not met.

At the same time core principles for successful industrial policies must be obeyed. They include evidence-based diagnosis, clearly set objectives (rather than micro-management), strong coordination mechanisms between different units and levels of government, sufficient administrative capacity and technical expertise, transparency and accountability to minimize rent-seeking and corruption. They should involve and be coordinated among a wide range of stakeholders, including businesses, labor unions, and civil society, to help build a broad consensus and long-term commitment to the strategy.[14]

While the imminent technological change can boost productivity and overall well-being, it will inevitably also produce segments of the population, which will lose and be alienated from the transition, and need to be supported. Government policies should defend and help people, not outdated business practices or companies. The authorities should focus on helping with infrastructure, research and training, where needed with re-qualification and some compensation for temporary income loss, and enact legislation that ensures decent working and living conditions also under the new economic circumstances.

[14] Compare also with Sandra Baquie, Yueling Huang, Florence Jaumotte, Jaden Kim, Rafael Machado Parente, Samuel Pienknagura, Industrial Policies: Handle with Care, March 21, 2025, https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2025/03/21/Industrial-Policies-Handle-with-Care-561795

Annex

Table 4: Major foreign firms engaged in renewables in the CAREC region in 2024-2025

Company	Country of Origin	Country of activity	Renewable Type	Project / Description
ACWA Power	Saudi Arabia	Azerbaijan	Wind	240 MW Khizi-Absheron wind (construction)
		Georgia	Wind	Hydro and wind feasibility
		Kazakhstan	Wind + Storage	1 GW wind + battery project
		Pakistan	Solar	Hybrid & solar MoUs
		Uzbekistan	Solar, Wind	2.5 GW portfolio (Nukus, Samarkand, Bukhara)
BP	UK	Azerbaijan	Solar	240 MW Jabrayil solar
China Energy Engineering Corp	PRC/Pakistan	Georgia	Hydro, Solar	EPC in Adjara, Kakheti
China Gezhouba Group	PRC	Pakistan	Hydro	Azad Pattan 700 MW HPP
		Tajikistan	Hydro	Rogun EPC
		Uzbekistan	Hydro	Hydropower modernization projects
ENI / Samruk-Kazyna JV	Italy/Kazakh-stan	Kazakhstan	Wind	Badamsha 2 wind farm (50 MW)
Goldwind	PRC	Kazakhstan	Wind turbines	Supplies turbines to Zhanatas wind farm
		Pakistan	Wind	Turbine supplier to Sindh projects
Huawei Digital Power	PRC	Azerbaijan	Solar, Smart Grid	Inverter and digital systems
HydroChina	PRC	Pakistan	Wind	Dawood Wind Power Project
Mainstream Renewable Power	Ireland	Mongolia	Wind	Feasibility for large-scale wind
Masdar	UAE	Azerbaijan	Solar	230 MW Garadagh solar (operational)
		Georgia	Solar, Wind	300 MW wind + 200 MW solar MoU
		Kazakhstan	Solar, Wind	500 MW Kyzylorda solar/wind
		Kyrgyzstan	Solar	200 MW solar (Issyk-Kul)
		Mongolia	Wind, Solar	Gobi hybrid wind-solar project
		Tajikistan	Solar	PV pilot projects
		Turkmenistan	Solar	100 MW Ashgabat solar
		Uzbekistan	Solar, Wind	Nur Navoi, Zarafshan, Sherabad PV farms
PowerChina	PRC	Kyrgyzstan	Hydro	Small hydro projects
		Mongolia	Wind	Wind EPC contracts
		Turkmenistan	Solar	Solar pilot EPC
Reon Energy + SANY	Pakistan/PRC	Pakistan	Wind	150 MW wind MoU
Risen Energy	PRC	Uzbekistan	Solar	PV module supply to Jizzakh, Surkhandarya
RusHydro	Russia	Kyrgyzstan	Hydro	Kambarata 1 HPP cooperation
Shanghai Electric	PRC	Pakistan	Solar, Wind	Renewable expansion under CPEC
SoftBank Energy	Japan	Mongolia	Wind, Solar	Asia Super Grid projects
Statkraft	Norway	Georgia	Hydro	Hydropower operations & expansions
TBEA Group	PRC	Kyrgyzstan	Solar	Solar feasibility & grid upgrades
TotalEnergies	France	Azerbaijan	Solar	120 MW Nakhchivan PV (planned)
		Kazakhstan	Solar, Wind	100 MW wind project, Zhambyl; expansion ongoing
		Mongolia	Solar	Grid-connected solar studies
		Uzbekistan	Solar	Tashkent region solar JV
Webuild (Salini Impregilo)	Italy	Tajikistan	Hydro	Rogun 3.6 GW hydropower dam

Source: Retrieved by the author from multiple media news with the help of AI

Table 5: Major foreign firms engaged in critical minerals in the CAREC region in 2024-2025

Company	Country of Origin	Country of activity	Primary role / mineral(s)
Anglo Asian Mining	UK	Azerbaijan (Gedabek)	Copper & gold operator
Barrick Gold	Canada	Pakistan	Copper / gold developer (Reko Diq)
BHP Group	Australia	Central Asia / Mongolia interest	Strategic explorer / technical cooperation (scouting lithium / copper)
CATL (Contemporary Amperex)	PRC	Uzbekistan, Mongolia, Kazakhstan interest	Battery manufacturer & offtake/investor dialogues
China Molybdenum (CMOC)	PRC	regional exploration interest	Copper / tungsten / rare metals
China National Gold Group	PRC	Mongolia & Central Asia interest	Gold / REE exploration & investment
Chinalco / Aluminum Corporation of China	PRC	Uzbekistan / regional MoUs	Metals / downstream & lithium/REE interest
CNMC / China Nonferrous	PRC	Tajikistan, Turkmenistan, Uzbekistan discussions	Copper / REE JV partner / investor
First Quantum Minerals	Canada	regionally active juniors / potential projects	Copper explorer & developer
FLSmidth	Denmark	Mongolia & Central Asian projects	Processing tech & EPC for mineral plants
Fortescue Metals Group	Australia	Mongolia & regional outreach	Battery-metals investment interest (copper/lithium scouts)
Glencore (via Kazzinc)	Switzerland	Kazakhstan	Base metals & refinery operator
Global Atomic / Govie partners	Canada	Georgia & Caucasus exploration	Uranium & REE exploration partnerships
International junior explorers	Australia/Canada	Mongolia, Kazakhstan	Lithium / battery-metals explorers across
Itochu / Marubeni / Mitsubishi Corporation	Japan	Uzbekistan, Mongolia	Trading houses & project investors in mining/jv deals
Ivanhoe Mines / Ivanhoe Electric	Canada/USA	Mongolia and region	Copper exploration projects
Jindal Steel & Power / Indian trading firms	India	Pakistan, Central Asia trade links	Metals trading & downstream investment
JOGMEC	Japan	Turkmenistan, Georgia, Uzbekistan	Exploration & tech for brine/lithium projects
KORES (Korea Resources Corporation)	SouthKorea	Uzbekistan	Strategic resource partnerships (Uzbekistan)
LG Energy Solution	SouthKorea	Uzbekistan, Kazakhstan interest	Battery supplier & potential downstream partnerships
Ma'aden (Saudi Arabian Mining Co.)	SaudiArabia	Uzbekistan / regional discussions	Investment & MoUs for base metals & copper
MCC (Metallurgical Corporation of China)	PRC	Afghanistan, Pakistan	Large copper developer (Mes Aynak, Saindak operator links)
Norinco / Norinco-linked Chinese groups	PRC	regional mining service providers	Industrial & exploration contractors
POSCO / POSCO International	SouthKorea	Kazakhstan, Uzbekistan interest	Lithium / nickel downstream offtake & processing MoUs
Rio Tinto	UK/Australia	Mongolia	Copper (Oyu Tolgoi) / major operator
Rönesans / Polimeks / Turkish contractors	Turkey	Azerbaijan & Central Asia	Contractors undertaking mining infrastructure & processing facilities
Samsung SDI	SouthKorea	Mongolia, Kazakhstan supply interest	Battery-cells supplier & strategic offtake talks
Sinopec / Sinopec affiliates	PRC	regionwide	Metals & processing partnerships (rare metals)
SNC-Lavalin / Worley / Jacobs (engineering firms)	Canada/Australia /USA	regionwide	EPC and metallurgy contractors for smelters and refineries
Sumitomo Metal Mining	Japan	region scouting	Nickel/cobalt/lithium investors & offtake MOUs
Thyssenkrupp Industrial Solutions	Germany	Kazakhstan / Uzbekistan projects	EPC for hydrometallurgical plants & refineries
Turquoise Hill Resources	Canada(Rio-owned)	Mongolia	Copper operator
Zijin / Xanadu (acquisition combos)	PRC	Mongolia	Copper developer (Kharmagtai)
Zijin Mining Group	PRC	Mongolia, Kyrgyzstan, Uzbekistan links	Copper / gold developer (Kharmagtai etc.)

Source: Retrieved by the author from multiple media news with the help of AI

Table 6: Major foreign firms engaged in EV's in the CAREC region in 2024-2025

Company	Country of Origin	Country of activity	Role in the EV ecosystem
ABB	Switzerland	Regional	Charging infrastructure & grid integration
Blink Charging	USA	Regional	EV charging operator via partners
Bosch	Germany	power electronics & thermal systems	EV components
BYD	PRC	Pakistan	OEM / Local assembly (JV with Mega Motors)
		Kazakhstan	Importer / dealer & model launches
		Uzbekistan	Sales & local partnerships / market launches
		Kyrgyzstan	Distributor / imports / dealer agreements
		Tajikistan	Distributor / imports / pilot projects
		Georgia	Market-entry discussions & imports
		Azerbaijan	Market entry discussions & imports
		Mongolia	Imports / dealer networks
		Afghanistan	Exploratory MOUs for EV imports
CATL	PRC	Regional	Battery supply & swap ecosystem
		Uzbekistan	Battery supply interest for local assembly
ChargePoint	USA	Regional	Charging network solutions via local partners
Denso	Japan	Regional	EV components & thermal management
Great Wall Motor (GWM)	PRC	Pakistan	OEM / KD assembly & sales
		Tajikistan/Turkmenistan	Distributor / KD assembly (regional)
Huawei	PRC	Afghanistan	Digital/charging solutions & smart-infra partners
Hyundai / Kia	South Korea	Uzbekistan	Importer & potential CKD/assembly partners
		Georgia	Dealers adding EV models
		Azerbaijan	Importer & dealers offering EV models
Hyundai Motor Company	South Korea	Kazakhstan/Regional	Importer / dealer (EV models)
IONITY	EU	Regional	High-power charging consortia (partners & potential regional projects)
Kia Corporation	South Korea	Kazakhstan/Regional	Importer / dealer (EV models)
LG Energy Solution	South Korea	Regional	Battery supplier / EV cells
Magneti Marelli / Marelli	Italy	Regional	EV electronics & charging components
NIO	PRC	Kyrgyzstan/Mongolia	Premium EV imports / exploratory talks
Samsung SDI	South Korea	Regional	Battery cells & modules
Schneider Electric	France	Regional	EV charging & energy management
Siemens	Germany	Regional	Charging infrastructure & smart-grid & e-mobility solutions
Siemens / ABB	Germany/Switzerland	Azerbaijan	Charging infrastructure & grid integration
		Mongolia	Charging infrastructure & grid integration
Tesla	USA	Georgia	Import / distribution conversations (dealer/charging pipeline)

Source: Retrieved by the author from multiple media news with the help of AI

Table 7: Major foreign firms engaged in AI and other digitalization activities in the CAREC region in 2024-2025

Company	Country of Origin	Sector	AI/Digitalization Activity
Amazon Web Services	USA	Cloud / Data	Cloud infrastructure & AI startup support
Beeline	Russia	Telecom	AI-driven network management
			AI in customer analytics
Deloitte	UK	Consulting	AI strategy, data analytics
			AI adoption consulting
			Digital governance assessment
			Digital Pakistan Initiative advisor
EPAM Systems	USA	IT / Software	AI software & digital platforms
			Software development & AI services
			AI software & training
EY	UK	Consulting	AI auditing and tax tech tools
			AI-driven digital audit services
Google	USA	Software	AI education and startup acceleration
Huawei	PRC	ICT / Telecom	AI cloud, 5G, smart city projects (Almaty, Astana)
			Smart city & AI surveillance (Uzbekistan)
			Smart Bishkek pilot (AI & smart city)
			AI and telecom modernization (Tajikistan)
			AI network management (Turkmenistan)
			AI cloud, Safe City projects (Pakistan)
			AI in telecom & energy (Mongolia)
Huawei Cloud	PRC	Cloud	AI data center (Tashkent)
IBM	USA	Software / Consulting	AI analytics, ML in finance
			AI for finance and logistics
Kaspersky	Russia	Cybersecurity	AI-based threat detection
			AI-enabled digital security
			AI-based security & automation
Mastercard	USA	Fintech	AI payment fraud systems
			AI fraud detection
Microsoft	USA	Software / Cloud	Azure AI and government cloud
			AI-driven education tools
			Cloud & AI literacy programs
			AI skilling and Azure expansion
			AI and cloud modernization
Oracle	USA	Software / Cloud	AI-enabled data management
			AI-supported ERP solutions
			AI ERP & digital public services
SAP	Germany	Software	AI ERP and analytics
Siemens	Germany	Industry / Energy	Smart grids, AI predictive maintenance
			Smart grid modernization
			Smart energy automation
			Smart mining & predictive maintenance
VEON / Beeline	Netherlands	Telecom	AI for telecom optimization
Yandex	Russia	IT / Transport	AI mapping & taxi services
ZTE	PRC	Telecom	Network automation & AI integration

Source: Retrieved by the author from multiple media news with the help of AI

Table 8: Type of industrial policy interventions during 2008-2025, number of interventions

Intervention Category	Intervention Type	PRC		CAREC other than the PRC	
		Frequency	%	Frequency	%
Domestic subsidies	Capital injection and equity stakes	400	3.95		
	Financial grant	702	6.93	87	2.86
	Import incentive	64	0.63	14	0.46
	In-kind grant	175	1.73		
	Interest payment subsidy	805	7.95	9	0.3
	Loan guarantee	177	1.75	3	0.1
	Price stabilisation	31	0.31	6	0.2
	Production subsidy	571	5.64	93	3.06
	State aid, nes	170	1.68		
	State aid, unspecified	1,365	13.47		
	State loan	803	7.93	13	0.43
	Tax or social insurance relief	1,753	17.31	274	9.01
	Sum	*7,016*	***69.28***	*499*	***16.42***
Export barriers	Export ban	55	0.54	230	7.56
	Export licensing requirement	103	1.02	2	0.07
	Export quota	111	1.1	29	0.95
	Export tax	127	1.25	57	1.87
	Export-related non-tariff measure, nes			28	0.92
	Local supply requirement for exports			2	0.07
	Sum	*396*	*3.91*	*348*	*11.44*
Export incentives	Export subsidy			4	0.13
	Other export incentive	90	0.89	184	6.05
	Tax-based export incentive	1	0.01	100	3.29
	Trade finance			324	10.65
	Sum	*91*	*0.90*	*612*	***20.12***
Foreign Direct Investment measures	FDI: Entry and ownership rule	108	1.07		
	FDI: Financial incentive	464	4.58		
	Public procurement access	3	0.03		
	Sum	*575*	*5.68*		
Import barriers	Anti-dumping	29	0.29	44	1.45
	Anti-subsidy	7	0.07	2	0.07
	Import ban	10	0.1	16	0.53
	Import licensing requirement	54	0.53	44	1.45
	Import price benchmark			27	0.89
	Import quota	30	0.3	10	0.33
	Import tariff	1,247	12.31	1,017	33.44
	Import tariff quota	77	0.76	24	0.79
	Import-related non-tariff measure, nes	2	0.02	7	0.23
	Internal taxation of imports	316	3.12	109	3.58
	Other import charges			184	6.05
	Sum	*1772*	***17.50***	*1484*	***48.81***
Localization content measures	Local content incentive	263	2.60	1	0.03
	Local content requirement	3	0.03	73	2.4
	Local operations requirement	1	0.01		
	Public procurement localisation	5	0.05		
	Sum	*272*	*2.69*	*74*	*2.43*
Other	Controls on commercial transactions			2	0.07
	Instrument unclear	2	0.02	5	0.16
	Labour market access	3	0.03	2	0.07
	Safeguard	1	0.01	13	0.43
	Technical barrier to trade	2	0.02	2	0.07
	Sum	*8*	*0.08*	*24*	*0.80*
Total		*10,130*	100	*3,041*	100

Source: Global Trade Alert (GTA), GTA Data Center https://globaltradealert.org/ , compiled by the author

Table 9: Sectors impacted by CAREC (other than the PRC) members' industrial policies, number of interventions

	2008-2019			2020-2025			Difference	Growth
Sector	**Frequency**	**%**	**Cumulative**	**Frequency**	**%**	**Cumulative**	**p.p.**	**%**
Products of agriculture, horticulture	92	6.2	6.2	148	9.6	9.6	3.40	60.9
Grain mill products, starches	79	5.3	11.5	98	6.3	15.9	1.04	24.1
Meat, fish, fruits, vegetables, oils	89	6.0	17.5	97	6.3	22.2	0.30	9.0
Basic chemicals	93	6.3	23.7	95	6.2	28.4	-0.10	2.2
Other chemical products	62	4.2	27.9	78	5.1	33.4	0.89	25.8
Yarn and thread	84	5.6	33.5	68	4.4	37.8	-1.24	-19.0
Rubber and plastics products	47	3.2	36.7	65	4.2	42.0	1.05	38.3
Textile articles other than apparel	46	3.1	39.8	59	3.8	45.9	0.73	28.3
Medical appliances, precision and optical instr.	35	2.4	42.1	55	3.6	49.4	1.21	57.1
Leather and leather products	49	3.3	45.4	53	3.4	52.8	0.14	8.2
Electrical machinery and apparatus	52	3.5	48.9	52	3.4	56.2	-0.13	0.0
Glass and glass products and other no	51	3.4	52.4	42	2.7	58.9	-0.71	-17.6
General-purpose machinery	66	4.4	56.8	39	2.5	61.5	-1.91	-40.9
Furniture	45	3.0	59.8	38	2.5	63.9	-0.56	-15.6
Knitted or crocheted fabrics	26	1.7	61.6	38	2.5	66.4	0.71	46.2
Special-purpose machinery	95	6.4	67.9	38	2.5	68.8	-3.92	-60.0
Wastes or scraps	44	3.0	70.9	36	2.3	71.2	-0.63	-18.2
Basic metals	39	2.6	73.5	35	2.3	73.4	-0.35	-10.3
Products of wood, cork, straw and pla	16	1.1	74.6	34	2.2	75.6	1.13	112.5
Transport equipment	66	4.4	79.0	34	2.2	77.8	-2.23	-48.5
Fish and other fishing products	37	2.5	81.5	30	1.9	79.8	-0.54	-18.9
Live animals and animal products	27	1.8	83.3	30	1.9	81.7	0.13	11.1
Pulp, paper and paper products	30	2.0	85.3	30	1.9	83.7	-0.07	0.0
Radio, television and communication e	34	2.3	87.6	29	1.9	85.6	-0.41	-14.7
Coke oven products	25	1.7	89.3	25	1.6	87.2	-0.06	0.0
Dairy products and egg products	20	1.3	90.7	23	1.5	88.7	0.15	15.0
Fabricated metal products, except mac	27	1.8	92.5	21	1.4	90.0	-0.45	-22.2
Beverages	12	0.8	93.3	14	0.9	90.9	0.10	16.7
Forestry and logging products	10	0.7	94.0	14	0.9	91.8	0.23	40.0
Other minerals	14	0.9	94.9	14	0.9	92.7	-0.03	0.0
Stone, sand and clay	7	0.5	95.4	14	0.9	93.7	0.44	100.0
Accommodation, food and beverage serv	0	0.0	95.4	12	0.8	94.4	0.78	
Retail trade services	0	0.0	95.4	10	0.6	95.1	0.65	
Recreational, cultural and sporting s	14	0.9	96.3	9	0.6	95.7	-0.36	-35.7
Crude petroleum and natural gas	9	0.6	96.9	8	0.5	96.2	-0.09	-11.1
Metal ores	9	0.6	97.5	8	0.5	96.7	-0.09	-11.1
Passenger transport services	0	0.0	97.5	6	0.4	97.1	0.39	
Coal and peat	4	0.3	97.8	5	0.3	97.4	0.06	25.0
Wholesale trade services	0	0.0	97.8	5	0.3	97.7	0.32	
Office, accounting and computing machines	8	0.5	98.3	4	0.3	98.0	-0.28	-50.0
Support services	4	0.3	98.6	4	0.3	98.3	-0.01	0.0
Tobacco products	5	0.3	98.9	4	0.3	98.5	-0.08	-20.0
Construction services	2	0.1	99.1	3	0.2	98.7	0.06	50.0
Education services	2	0.1	99.2	3	0.2	98.9	0.06	50.0
Electricity, town gas, steam and hot water	0	0.0	99.2	2	0.1	99.0	0.13	
Freight transport services	0	0.0	99.2	2	0.1	99.2	0.13	
Maintenance, repair and installation	0	0.0	99.2	2	0.1	99.3	0.13	
Manufacturing services on physical in	0	0.0	99.2	2	0.1	99.4	0.13	
Other services	0	0.0	99.2	2	0.1	99.5	0.13	
Supporting transport services	0	0.0	99.2	2	0.1	99.7	0.13	
Telecommunications, broadcasting	10	0.7	99.9	2	0.1	99.8	-0.54	-80.0
Professional, technical and business services	0	0.0	99.9	1	0.1	99.9	0.06	
Real estate services	0	0.0	99.9	1	0.1	99.9	0.06	
Uranium and thorium ores and concentrates	2	0.1	100.0	1	0.1	100.0	-0.07	-50.0
Traditional	*1232*	*82.8*		*1388*	*89.9*		***7.1***	***12.7***
Advanced technology	*256*	*17.2*		*156*	*10.1*		***-7.1***	***-39.1***
Total	*1488*	*100.0*		*1544*	*100.0*		***0.0***	***3.8***

Note: Ordered by descending frequency in the overall 2008-2025 period. Sectors more closely related to energy and AI transition are marked in red; an increase in the percentage of interventions in 2020-2025 compared to 2008-2019 is marked in green, a decrease in violet.

Source: Global Trade Alert (GTA), GTA Data Center https://globaltradealert.org/ , compiled, calculated by the author

Table 10: Sectors impacted by PRC industrial policies, number of interventions

	2008-2019			2020-2025			Difference	Growth
Sector	**Frequency**	**%**	**Cumulative**	**Frequency**	**%**	**Cumulative**	**p.p.**	**%**
Special-purpose machinery	239	6.3	6.3	294	4.7	4.7	-1.63	23
Basic chemicals	191	5.0	11.3	255	4.0	8.7	-0.99	34
Radio, television and communication e..	162	4.3	15.6	263	4.2	12.8	-0.10	62
Basic metals	218	5.7	21.3	199	3.2	16.0	-2.58	-9
Transport equipment	155	4.1	25.4	217	3.4	19.4	-0.65	40
Electrical machinery and apparatus	155	4.1	29.5	208	3.3	22.7	-0.79	34
General-purpose machinery	146	3.8	33.3	212	3.4	26.1	-0.49	45
Meat, fish, fruits, vegetables, oils ..	102	2.7	36.0	245	3.9	29.9	1.19	140
Furniture	107	2.8	38.8	220	3.5	33.4	0.67	106
Coke oven products	115	3.0	41.8	209	3.3	36.7	0.28	82
Grain mill products, starches and sta..	103	2.7	44.5	218	3.5	40.2	0.74	112
Glass and glass products and other no..	118	3.1	47.6	201	3.2	43.3	0.08	70
Pulp, paper and paper products	101	2.7	50.3	214	3.4	46.7	0.72	112
Yarn and thread	86	2.3	52.5	229	3.6	50.3	1.36	166
Products of wood, cork, straw and pla..	87	2.3	54.8	215	3.4	53.7	1.11	147
Products of agriculture, horticulture..	100	2.6	57.5	185	2.9	56.7	0.29	85
Other chemical products	95	2.5	60.0	165	2.6	59.3	0.11	74
Medical appliances, precision and opt..	108	2.8	62.8	146	2.3	61.6	-0.53	35
Rubber and plastics products	93	2.4	65.2	149	2.4	63.9	-0.10	60
Leather and leather products	60	1.6	66.8	162	2.6	66.5	0.98	170
Fabricated metal products, except mac..	84	2.2	69.0	122	1.9	68.4	-0.28	45
Wastes or scraps	61	1.6	70.6	119	1.9	70.3	0.28	95
Textile articles other than apparel	49	1.3	71.9	119	1.9	72.2	0.59	143
Beverages	44	1.2	73.1	110	1.7	73.9	0.58	150
Professional, technical and business ..	67	1.8	74.8	78	1.2	75.2	-0.53	16
Recreational, cultural and sporting s..	54	1.4	76.3	77	1.2	76.4	-0.20	43
Telecommunications, broadcasting and ..	67	1.8	78.0	59	0.9	77.3	-0.83	-12
Office, accounting and computing mach..	52	1.4	79.4	67	1.1	78.4	-0.31	29
Knitted or crocheted fabrics	29	0.8	80.1	87	1.4	79.7	0.62	200
Financial and related services	43	1.1	81.3	67	1.1	80.8	-0.07	56
Dairy products and egg products	28	0.7	82.0	77	1.2	82.0	0.48	175
Manufacturing services on physical in..	65	1.7	83.7	37	0.6	82.6	-1.13	-43
Other minerals	44	1.2	84.9	51	0.8	83.4	-0.35	16
Fish and other fishing products	43	1.1	86.0	49	0.8	84.2	-0.36	14
Supporting transport services	28	0.7	86.7	58	0.9	85.1	0.18	107
Support services	37	1.0	87.7	46	0.7	85.8	-0.24	24
Research and development services	34	0.9	88.6	47	0.7	86.6	-0.15	38
Stone, sand and clay	28	0.7	89.4	53	0.8	87.4	0.10	89
Live animals and animal products (exc..	32	0.8	90.2	44	0.7	88.1	-0.14	38
Sewage and waste collection, treatmen..	34	0.9	91.1	40	0.6	88.7	-0.26	18
Electricity, town gas, steam and hot ..	18	0.5	91.6	54	0.9	89.6	0.38	200
Education services	18	0.5	92.0	53	0.8	90.4	0.37	194
Human health and social care services	22	0.6	92.6	44	0.7	91.1	0.12	100
Metal ores	20	0.5	93.1	38	0.6	91.7	0.07	90
Construction services	15	0.4	93.5	42	0.7	92.4	0.27	180
Retail trade services	8	0.2	93.7	47	0.7	93.1	0.53	488
Freight transport services	14	0.4	94.1	39	0.6	93.8	0.25	179
Accommodation, food and beverage serv..	4	0.1	94.2	47	0.7	94.5	0.63	1075
Crude petroleum and natural gas	29	0.8	95.0	17	0.3	94.8	-0.49	-41
Legal and accounting services	19	0.5	95.5	25	0.4	95.2	-0.10	32
Other services	12	0.3	95.8	25	0.4	95.6	0.08	108
Passenger transport services	8	0.2	96.0	29	0.5	96.0	0.25	263
Wholesale trade services	16	0.4	96.4	18	0.3	96.3	-0.14	13
Coal and peat	20	0.5	96.9	13	0.2	96.5	-0.32	-35
Tobacco products	8	0.2	97.2	25	0.4	96.9	0.19	213
Forestry and logging products	15	0.4	97.6	16	0.3	97.2	-0.14	7
Services of membership organizations	9	0.2	97.8	21	0.3	97.5	0.09	133
Support and operation services to agr..	16	0.4	98.2	14	0.2	97.7	-0.20	-13
Maintenance, repair and installation ..	9	0.2	98.4	20	0.3	98.0	0.08	122
Other manufacturing services	11	0.3	98.7	18	0.3	98.3	-0.01	64
Public administration and other servi..	12	0.3	99.1	14	0.2	98.5	-0.10	17
Constructions	5	0.1	99.2	13	0.2	98.7	0.08	160
Electricity, gas and water distributi..	7	0.2	99.4	11	0.2	98.9	-0.01	57
Leasing or rental services without op..	2	0.1	99.4	14	0.2	99.1	0.17	600
Real estate services	6	0.2	99.6	9	0.1	99.3	-0.02	50
Uranium and thorium ores and concentr..	2	0.1	99.6	13	0.2	99.5	0.16	550
Natural water	2	0.1	99.7	11	0.2	99.7	0.12	450
Rental services of transport vehicles..	4	0.1	99.8	6	0.1	99.7	-0.02	50
Domestic services	3	0.1	99.9	6	0.1	99.8	**0.01**	**100**
Postal and courier services	3	0.1	99.9	6	0.1	99.9	**0.01**	**100**
Services provided by extraterritorial..	2	0.1	100.0	6	0.1	100.0	0.04	200
Traditional	*2635*	*72.6*		*4715*	*74.5*		***5.2***	***78.9***
Advanced technology	*1168*	*30.7*		*1612*	*25.5*		*-5.2*	*38.0*
Total	*3,803*	*100*		*6,327*	*100*		***0.0***	***66.4***

Source: GTA Data Center https://globaltradealert.org/ , compiled, calculated by the author

Table 11: AI strategy/initiatives

Country	National AI strategy (year / status)	Major AI projects / flagship initiatives
Azerbaijan	Artificial Intelligence Strategy of the Republic of Azerbaijan for 2025–2028; Presidential Decree, March 19, 2025	National AI standards (AZSTAND TK-05); e-services automation; AI in agriculture; academic-industry partnerships
PRC	New Generation Artificial Intelligence Development Plan, released by the State Council of the People's Republic of China in July 2017. "Opinions on Deepening the Implementation of the 'Artificial Intelligence Plus' Initiative (aka the "AI+ Action Plan"), setting integrated targets for 2027, 2030 and 2035, August 26, 2025,	National AI Innovation Centers; Beijing AI Pilot Zone; Shanghai AI Island; generative AI regulation; AI + Manufacturing & Energy programs
Georgia	Draft "National Strategy on Artificial Intelligence" (concept document presented)	IDFI-GAIA memorandum (2024); GAIA ecosystem programs; AI ethics and governance drafting
Kazakhstan	Concept for the Development of Artificial Intelligence for 2024–2029, July 16, 2024, Government of Kazakhstan decision	Launch of international AI centre Alem.AI (training, research, startups); development of Kazakh LLMs (AlemLLM / KazLLM variants); national cloud / supercomputing "alem.cloud"; gov't AI regulatory work and training programs (aims to train many thousands).
Kyrgyz Republic	Draft "National Strategy on Artificial Intelligence" (to be approved), Jan 31, 2025 announced	Events and partnerships (Skoltech sessions, "Point of Attraction: Bishkek" project); proposals for a regional AI hub; digital transformation projects in health/education/security.
Mongolia	Draft "National Strategy on Big Data & Artificial Intelligence" (presented for discussion on May 19, 2025	GPU cluster and data infrastructure plans; AI ambassador training; UNDP AI national conference
Pakistan	National Artificial Intelligence Policy (National AI Policy 2025), July 30, 2025, Federal Cabinet approval	AI Centres of Excellence; National AI Fund; Digital Pakistan framework; AI R&D and startup programs
Tajikistan	Strategy for the Development of Artificial Intelligence in the Republic of Tajikistan for the period up to 2040, September 2022, Government decree	Ambitious government program aiming to create an AI ecosystem (talent, data, ethical AI); proposals for a regional AI centre in Dushanbe; active diplomacy on AI at the UN (Tajikistan led a UN GA resolution on AI).
Turkmenistan	Aspect in wider digital-economy plans (2019–2025)	AI in education pilots / conferences (Ministry of Education & UNESCO), participation in regional AI forums
Uzbekistan	Strategy for the Development of Artificial Intelligence Technologies until 2030, October 14, 2024, Presidential Resolution	National AI strategy implementation: >30 pilot projects across public services, finance, health; building a national Uzbek language model / datasets; targets for AI sector growth and skill building.

Source: Compiled by the author from multiple media

Table 12: Renewables strategy/initiatives

Country	Renewables strategy (year / status)	Major projects / flagship initiatives
Azerbaijan	State Program for the Use of Alternative and Renewable Energy Sources, 21 October 2004, Presidential Resolution of the Republic of Azerbaijan, 2004	Wind power (Khizi-Absheron 240 MW) under construction; grid-integration study to identify export 4 GW by 2040.
PRC	Renewable Energy Law of the People's Republic of China February 28, 2005 (adopted by the National People's Congress; entered into force January 1, 2006); Medium- and Long-Term Development Plan for Renewable Energy September 2007	Massive installation of wind & solar (357 GW added in 2024) AP News; heavy-industry renewables mandates for 2025; offshore wind & solar bases.
Georgia	National Renewable Energy Action Plan (NREAP), Ministry of Energy of Georgia, 2015	Studies and tech analyses on hybrid renewables + small modular reactors to decarbonise grid.
Kazakhstan	Concept for the Transition of the Republic of Kazakhstan to a Green Economy, 2013, Government of Kazakhstan Decree, 2013	By June 2025 installed renewables ~3.1 GW; projects under development 10.3 GW; plan 93 new RE projects (2.3 GW) by 2030.
Kyrgyz Republic	Strategy for Development of the Fuel and Energy Complex (to 2025), 2008–2009, Government of the Kyrgyz Republic, Energy Sector Strategy 2008/2009; The Ministry of Energy of the Kyrgyz Republic initiated amendments to the Law on Electric Power, with the draft now open for public discussion.	The Toru-Aigyr Solar Power Plant (300 MW, Issyk-Kul region) project includes a 25-year power purchase agreement with the national grid (National Electric Grid of Kyrgyzstan) and a public-private partnership with the country's Ministry of Energy.
Mongolia	Law on Renewable Energy, 2007 (amended 2015), Parliament of Mongolia, Renewable Energy Law 2007	Tech-economic analysis of hybrid solar/wind/battery/SMR systems.
Pakistan	Policy for Alternative & Renewable Energy (ARE Policy 2019), 2019, Government of Pakistan Gazette Notification, 2019	Projects/announcements: e.g., new renewables capacity and investment incentives; green-economy programs.
Tajikistan	Renewable Energy Program 2023–2027 (Government Resolution), 1 March 2023, Government Resolution on Renewable Energy Program 2023–2027 National Green-Energy Roadmap unveiled in June 2025	Agreements for 2 GW solar projects (Oct 2025) Trend; major hydropower expansion (Rogun Hydropower Plant) with multilateral financing.
Turkmenistan	Law on Renewable Energy Sources enacted 2021; "Public Outreach Strategy on RE & Energy Efficiency" launched March 2025.	First solar-wind plant (10 MW) in Balkan region; Desert Solar / Caspian wind corridor concepts.
Uzbekistan	Law on Use of Renewable Energy Sources / Energy Strategy 2019–2030 (Decree PP-4477), May–October 2019, Presidential Decree PP-4477, 4 October 2019.	Program: 35,000 households + 27,000 facilities solar; 3,000 small hydropower plants by 2026 (164 MW); launch 16 RE facilities by end of 2025.

Source: Compiled by the author from multiple media sources

Table 13: FDI policy measures by CAREC members in 2020-2025

Country	Date	Measure
Azerbaijan	7-Jan-25	Cuts Branch Profit Tax Rate in Half
	1-Jan-20	Tax exemption period in industrial and hi-tech parks has been extended (Tax Code amendment)
PRC	15-Sep-25	Liberalizes and facilitates reinvestment of foreign-exchange profits by foreign investors
	30-Jun-25	Introduces tax credit for foreign investors reinvesting distributed profits
	11-Apr-25	Expands pilot program for opening-up services to FDI
	12-Mar-25	New incentives for FDI in Shenzen
	9-Jan-25	Lifts restrictions on foreign investment companies using domestic loans to carry out equity investment
	1-Nov-24	Eases rules for foreign investment in listed companies
	7-Sep-24	Relaxed restrictions on foreign investment in the healthcare sector
	9-May-24	Introduces subsidies for foreign investment in manufacturing and services in selected regions
	8-Apr-24	Allows 100 per cent foreign ownership in certain value-added telecommunication services
	1-Sep-23	Shanghai allows expatriates working for foreign-invested companies to transfer their income abroad without restrictions
	1-Sep-23	Eased capital transfer policy for foreigners in Shanghai to woo foreign investment
	28-Aug-23	Extends tax breaks for foreign workers until 2027
	25-Oct-22	Expands list of manufacturing sectors open to foreign investment
	8-Oct-22	Tests the selective opening of tourism to foreign investment in Tianjin, Shanghai, Hainan, and Chongqing
	15-Mar-22	Enhances facilitation of foreigners' work permits in Guangzhou
	1-Jan-22	Issued new Negative List for Foreign Direct Investment
	22-Oct-21	Issues the "14th Five-Year Development Plan for Utilizing Foreign Capital"
	20-Apr-21	Opens several services sector to FDI in Tianjin, Shanghai, Hainan, and Chongqing
	10-Mar-21	Abolishing the restrictions on foreign shareholding in joint venture life insurance companies
	25-Feb-21	New Circular on Building a New Development Pattern and Effectively Stabilizing Foreign Investment
	1-Feb-21	Releasing Special Administrative Measures for the Access of Foreign Investment in Hainan Free Trade Port (2020 Edition)
	27-Jan-21	Duty Exemption for Foreign Investment in Encouraged Industries
	27-Dec-20	New version of Catalogue of Industries for Encouraging Foreign Investment
	24-Nov-20	Shanghai introduces support policies to encourage foreign R&D centers
	1-Nov-20	Shanghai adopts new foreign investment regulations
	18-Oct-20	Giving Shenzhen greater autonomy to attract investment
	1-Oct-20	New mechanism to handle complaints by foreign-invested entities
	23-Jul-20	Releases updated versions of its two negative lists
	14-Feb-20	Shanghai moves to open up financial sector
	1-Jan-20	Trial measures to further facilitate FDI in Yangtze River Delta
Kazakhstan	31-Dec-24	Implements facilitation mechanisms for priority investments
	16-Dec-24	Mandates financial assurances for land allocation in investment projects
	18-Oct-24	Approves the Concept of Investment Policy 2024-2029
	1-Apr-24	Launches a National Digital Investment Platform
	2-Jan-21	Kazakhstan introduces investment agreements
Pakistan	20-Jun-23	Establishes the Special Investment Facilitation Council (SIFC)
	31-Dec-22	Outsources the management and operation of the three major international airports to foreign investors
	27-Oct-20	New mechanism to enable companies to conveniently remit disinvestment proceeds to foreign shareholders
	25-Jun-20	Launched e-portals to facilitate investment (BOI portals)
	2023	The Pakistan Investment Policy 2023 introduces several reforms to attract foreign investors
Uzbekistan	16-May-24	Adopts new law on privatization of State property
	21-Jul-23	Introduces "one-stop-shop" and other services to assist investors
	10-Sep-22	Introduces tax incentives for renewable energy producers
	7-Jun-22	Offers State budget support to provide investment projects above UZS200 billion with external infrastructure
	8-Apr-22	Adopts new tax incentives to guarantee wider private sector participation
	18-Mar-22	Privatizes assets in banking, telecommunication, and real estate
	7-Oct-21	New incentives to foreign investors in mining and natural resources sectors
	18-Aug-21	Adopts the International Commercial Arbitration law (based on the UNCITRAL Model Law)
	11-Nov-20	Creates a new free economic zone for agricultural production and exports
	27-Oct-20	Privatizes several State assets
	1-Sep-20	New rules on foreign exchange transactions
	18-Feb-20	Law on Special Economic Zones adopted
	26-Jan-20	Adopts a comprehensive law on investment

Source: UNCTAD, Investment policy monitor, https://investmentpolicy.unctad.org/investment-policy-monitor, compiled by the author