



# Economic Brief

Promoting Electric Vehicle (EV) Deployment  
in the CAREC Region

By  
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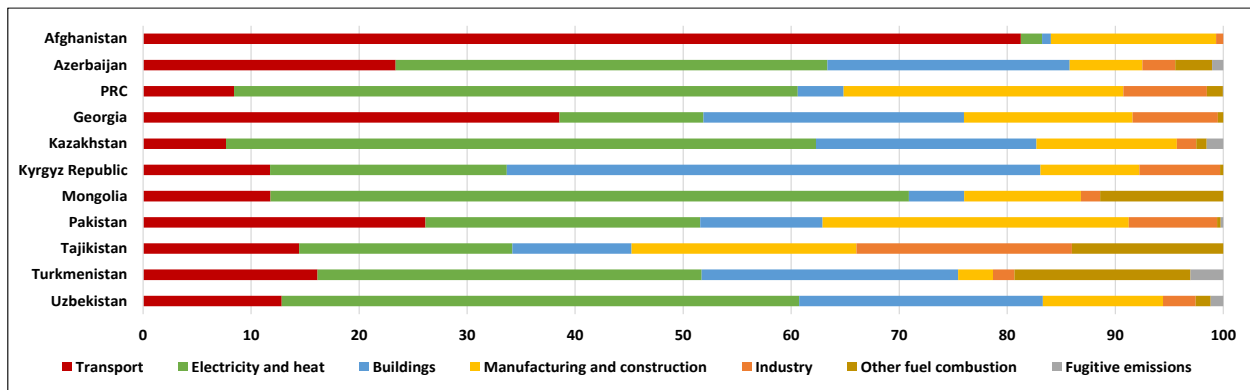
## Abbreviations

ASEAN	Association of Southeast Asian Nations
BEV	Battery Electric Vehicle
CAREC	Central Asia Regional Economic Cooperation
CO <sub>2</sub>	Carbon dioxide
EU	European Union
EV	Electric Vehicle
FTA	Free Trade Agreement
GHG	Greenhouse Gas
ICEV	Internal Combustion Engine Vehicle
IEA	International Energy Agency
NDC	Nationally Determined Contribution
NEV	New Energy Vehicle
PHEV	Plug-in Hybrid Electric Vehicle
PRC	People's Republic of China
R&D	Research and Development
RCEP	Regional Comprehensive Economic Partnership
SWOT	Strengths, Weaknesses, Opportunities, Threats
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USD	United States Dollar
VAT	Value Added Tax

**Along with the power and industry sectors, transport contributes the most to global greenhouse gas (GHG) emissions.** According to the International Energy Agency (IEA), transport made up over one-third of global CO<sub>2</sub> emissions out of all end-use sectors, with its average emission growth rate increasing faster than for any other sectors from 1990 to 2022 except for industry. In 2022, the amount of global CO<sub>2</sub> emissions from the transport sector grew by 2.1% to nearly 8 gigatonnes, rebounding almost to the pre-pandemic year of 2019 level.<sup>1</sup>

**Resembling most other regions in the world, transport is also the largest source of GHG emissions in the CAREC region.** Average CAREC CO<sub>2</sub> emissions by transport sector accounted for almost a quarter of total CO<sub>2</sub> emissions from all sectors. Afghanistan and Georgia saw the largest transport-induced CO<sub>2</sub> emissions relative to other sectors, with the share accounting for 81.3% and 38.5%, respectively (Figure 1). The high share by transport in Afghanistan reflects the weakness of other industries, less developed infrastructure, shortage of electricity, among others. Transport was the second largest CO<sub>2</sub> emitter in Azerbaijan, Pakistan, and Mongolia; in Azerbaijan and Pakistan the share exceeded 20%. By contrast, the PRC and Kazakhstan saw a share of less than 10% of CO<sub>2</sub> emissions from transport thanks to their highly diversified economic structure.

**Figure 1. Annual CAREC CO<sub>2</sub> emissions by sector (excluding land-use change and forestry), in % of total CO<sub>2</sub> emissions, 2019**



Source: Our World in Data; author's calculations.

**Road transport faces greater pressure to reduce GHG emissions in contrast to other modes of transportation given its large volume of traffic, with the CAREC region no exception.** By 2019, the share of global CO<sub>2</sub> emissions from road transport, notably from on-road passenger and freight vehicles, was as high as 69%, far above the share of emissions from aviation (11%), maritime (11%), and rail (1%) transport.<sup>2</sup> And Asia, as a result of its large population and strong economic growth, experienced the most rapid increase of transport-induced CO<sub>2</sub> emissions by 36% during 2010-21, higher than any other regions in the world.<sup>3</sup> Cases in the CAREC region are yet unclear, but most member countries in this region are landlocked,<sup>4</sup> and movement of people and goods is thus heavily dependent on road transport.

<sup>1</sup> <https://www.iea.org/reports/co2-emissions-in-2022>

<sup>2</sup> [https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC\\_AR6\\_WGIII\\_FullReport.pdf](https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf)

<sup>3</sup> <https://tcc-gsr.com/wp-content/uploads/2023/09/SLOCAT-Transport-Climite-and-Sustainability-Global-Status-Report-%E2%80%933rd-Edition.pdf>

<sup>4</sup> <https://www.adb.org/sites/default/files/publication/870111/eawp-060-geographical-proximity-trade-impacts-carec.pdf>

Available data suggest that typical vehicle fleet during 2010-19 increased annually by 9% in the PRC, 7% in Georgia, 3% in Kazakhstan, 13% in the Kyrgyz Republic, 20% in Mongolia, and 15% in Pakistan.<sup>5</sup>

**Electrification of the road transport sector by shifting from internal combustion engine vehicles (ICEVs) to EVs is crucial for decarbonization.** Indeed, all new on-road EVs have helped reduce global emissions by 13 megatonnes in 2022, according to IEA's estimation.<sup>6</sup> However, this is far from enough. Available evidence indicates that to limit the global temperature rise to 1.5°C CO2 emissions from transport-related sectors should be cut by around 70-80% in 2050 compared to the 2015 level, with the carbon footprint to be restrained to 2-3 gigatonnes by then.

**Deployment of EVs not only facilitates the implementation of the countries' Nationally Determined Contributions (NDCs),<sup>7</sup> but it also offers many other benefits to the society.** Data from Fuel Economy.gov suggest that EVs are 3-6 times more energy-efficient than ICEVs,<sup>8</sup> resulting in more savings of fossil energy and thereby less dependence on fuel imports. Moreover, the thriving EV-related industry creates numerous new employment opportunities, notably in the realm of technology and R&D. BYD, one of the world biggest EV giants, for example, is reported to have enrolled 31,800 fresh graduates since the beginning of 2023, and among them 80.8% will be assigned to R&D positions.<sup>9</sup> Other advantages of EVs prevailing over ICEVs include lower fuel and maintenance costs,<sup>10</sup> better driving experience such as provision of quieter performance and stronger acceleration, and their capability of electricity storage to smoothen the peak-valley difference of the power grid.<sup>11</sup>

The CAREC region's (excluding the PRC) EV industry is in nascent stages but with an increasing development momentum

**The transition to electromobility has been ongoing for years and continues to accelerate around the globe, with the PRC and many advanced economies taking the lead.** Globally, the EV sales exceeded 10 million in 2022, accounting for 14% of total new car sales, significantly higher than the share in 2020 (below 5%) and in 2021 (around 9%). According to the IEA's projections, the share of EV sales is expected to increase to 18% in 2023 and 35-40% in 2030.<sup>12</sup> By country or region, the PRC, the EU and the US remained the world largest EV markets in 2022, and the electric cars in the three economies collectively made up around 95% of total global sales. The ultra-high share is in alignment with their recent climate mitigation policies or legislations, which are known as "30-60" decarbonization agenda<sup>13</sup> in the PRC, new

<sup>5</sup> <https://www.carecprogram.org/uploads/20th-TSCC-16-TSCC-Decarbonization-EN.pdf>

<sup>6</sup> <https://www.iea.org/reports/co2-emissions-in-2022>

<sup>7</sup> NDCs are national climate plans for implementing the Paris Agreement. The relevant documents are submitted to the UNFCCC secretariat every five years. <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs>

<sup>8</sup> <https://new.qq.com/rain/a/20230401A05Y8J00> (author's translation)

<sup>9</sup> <https://thinkercarinsider.com/2023/07/30/byds-2023-campus-recruitment-concluded-with-31800-recent-graduates-joining/>

<sup>10</sup> The estimated scheduled maintenance cost for a BEV amounts to 6.1 cents per mile, while for an ICEV the cost adds up to 10.1 cents per mile. <https://www.energy.gov/eere/vehicles/articles/fotw-1190-june-14-2021-battery-electric-vehicles-have-lower-scheduled>

<sup>11</sup> The batteries in the EVs serve as "power banks" to be connected to the grid through IoT technology. The electricity from the grid can charge the batteries in the EVs during low electricity consumption periods, and the batteries in the EVs discharge electricity to the grid during peak electricity consumption periods.

<sup>12</sup> <https://iea.blob.core.windows.net/assets/dacf14d2-eabc-498a-8263-9f97fd5dc327/GEVO2023.pdf>

<sup>13</sup> "30-60" refers to the PRC's commitment to peak its CO2 emissions by 2030 and achieve carbon neutrality by 2060. Promotion of low-carbon transportation is one of the key actions to achieve the goal set in "30-60".

CO2 standards<sup>14</sup> under the “Fit for 55” package in the EU, and Inflation Reduction Act<sup>15</sup> in the US. Norway, Sweden, and the Netherlands remained the top three countries with the highest share of EV sales in 2022, at 88%, 54% and 35%, respectively. The high EV adoption rates in these countries were predominantly driven by preferential EV policies, low electricity prices, well-developed charging infrastructure, and people’s high awareness of environmental protection.

**Compared with early EV adopters, the EV deployment in the CAREC region (except for the PRC) is still in nascent stages. Despite this, most member economies have introduced policy packages to accelerate their EV transitions.** So far, the majority of the CAREC economies have set specific targets for road transport electrification. Afghanistan targets 10% of new vehicles to be EVs by 2030, and in Mongolia the share is expected to reach 13%, in the PRC 40-50%, in Georgia 50%, in Uzbekistan 30% by 2035, and in Pakistan 30-50% by 2030, and 90% by 2040 (Annex). Meanwhile, Azerbaijan is a member of “Accelerating to Zero (A2Z) Coalition”,<sup>16</sup> which is committed to have all new vehicle sales being zero emission by no later than 2040. Although Kazakhstan and Turkmenistan have no such clear targets disclosed, both economies have also set ambitious goals in transport decarbonization. Kazakhstan projects to improve its EV production capacity from 1,200 units in 2021 to 2,000 units in 2022.<sup>17</sup> Turkmenistan completed the first phase in building its first “smart city”, where environmentally friendly facilities such as e-buses, e-cars, and “smart” parking lots were intensively deployed.<sup>18</sup>

**Correspondingly, most CAREC economies have rolled out policy incentives to boost their domestic EV deployment.** While the provision of EV-related subsidies varies significantly across the member economies, practices of tax exemptions or reductions seem more alike. EVs, particularly battery electric vehicles (BEVs), in multiple economies such as Georgia, Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan are exempt completely from the import duties. Besides, BEVs in Azerbaijan and Georgia, and imported EVs in Pakistan (including locally produced EVs), Tajikistan and Uzbekistan are exempt also from the excise tax. Furthermore, BEVs in Azerbaijan, and imported EVs in Tajikistan are exempt from the value-added tax (VAT). The PRC, one of the major EV producers in the world, mainly boosts its EV sales through exemptions or reductions of the vehicle purchase taxes. The most updated policy came out in mid-2023 with a third-time extension of purchase tax exemption for new energy vehicles (NEVs)<sup>19</sup> until year-end 2025, and a reduction of 50% on purchase tax payment in 2026-27.<sup>20</sup>

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[https://english.www.gov.cn/policies/latestreleases/202110/24/content\\_WS61755fe9c6d0df57f98e3bed.html](https://english.www.gov.cn/policies/latestreleases/202110/24/content_WS61755fe9c6d0df57f98e3bed.html)

<sup>14</sup> “New CO2 standards” issued by the EU in April 2023 requires that CO2 emissions of new cars and vans will be reduced by 55% and 50% respectively from 2030 to 2034 (compared to 2021), and by 100% for both from 2035 onwards.

[https://climate.ec.europa.eu/eu-action/transport/road-transport-reducing-co2-emissions-vehicles/co2-emission-performance-standards-cars-and-vans\\_en](https://climate.ec.europa.eu/eu-action/transport/road-transport-reducing-co2-emissions-vehicles/co2-emission-performance-standards-cars-and-vans_en)

<sup>15</sup> “Inflation Reduction Act” programs will help reduce the US’s GHG emissions by 50-52% in 2030 compared to 2005 and achieve net zero emissions by 2050. According to the Act, the EV industry is to receive dedicated funding from the USD 369 billion allotted to climate investments. <https://www.epa.gov/inflation-reduction-act>

<sup>16</sup> Accelerating to Zero (A2Z) Coalition was launched at COP27 which took place in Egypt in 2022. The Coalition includes more than 200 signatories from different sectors with the aim to supercharge transportation emissions ambitions initiated at COP26. <https://acceleratingtozero.org/accelerating-to-zero-a2z-coalition-launches-at-cop27-to-drive-global-transition-to-zero-emission-vehicles/>

<sup>17</sup> <https://primeminister.kz/en/news/reviews/production-of-electric-vehicles-new-plant-and-access-to-export-markets-development-of-kazakhstans-mechanical-engineering-in-a-new-reality>

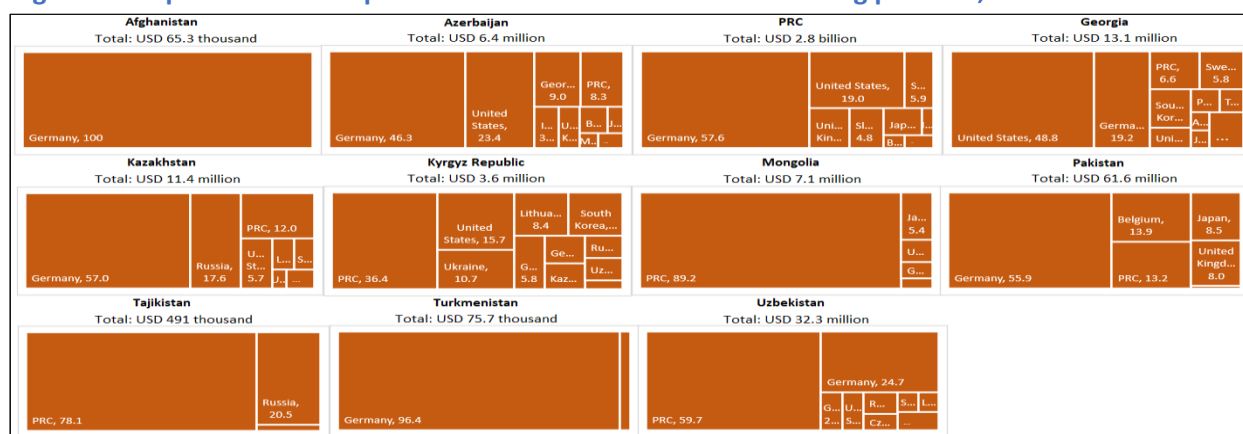
<sup>18</sup> <https://www.silkroadbriefing.com/news/2023/06/30/turkmenistan-unveils-arkadag-its-futuristic-new-smart-city/>

<sup>19</sup> In the PRC, new energy vehicles (NEVs) refer to battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell electric vehicles (FCEVs).

<sup>20</sup> [https://english.www.gov.cn/news/202306/22/content\\_WS6493ab47c6d0868f4e8dd1d0.html](https://english.www.gov.cn/news/202306/22/content_WS6493ab47c6d0868f4e8dd1d0.html)

Thanks to the proactive policies and incentives, the EV market in the CAREC region is growing rapidly, dominated still by imported EVs though. In 2021, the total value of the imported EVs<sup>21</sup> in the CAREC region except for the PRC amounted to USD 136 million, two times more than that of 2019 (Figure 2). Germany, the PRC, and the US, the top three EV exporters in the world, accounted for the largest proportion of the CAREC's EV imports. In the meantime, the number of EV imports from Russia by Kazakhstan and Tajikistan, from Ukraine by the Kyrgyz Republic, and from Belgium by Pakistan were also significant. The PRC, despite being a main EV exporter, imported EVs worthy of USD 2.8 billion also from other countries in 2021, particularly from Germany and the US. More recent comparable EV data of the CAREC economies are still unavailable, but media reporting indicates that the EV market of the region continued to expand in 2022-23. Kazakhstan's EV sales between March 2022 and March 2023 increased from 631 units to 1,900 units.<sup>22</sup> The total value of EVs imported by Azerbaijan in Q1 2023 was year-on-year 4.8 times higher than a year earlier to nearly USD 17 million,<sup>23</sup> and in Uzbekistan in January-April 2023 the number of imported EVs was around 3.5 times higher compared to the same period of the previous year to 2,544 units.<sup>24</sup> The number of EVs imported by the Kyrgyz Republic (from the PRC alone) in January-August 2023 was nearly six times more than the same period of 2022, reaching 4,085 units.<sup>25</sup> Also, the imported EV numbers of Tajikistan in H1 2023 almost caught up with the total number imported in the full year 2022.<sup>26</sup>

Figure 2. Proportion of EV imports from the CAREC economies' trading partners, 2021



Source: OEC.world; author's compilations.

**Localizing EV production is emerging in the CAREC region, facilitated by the economic and social potential of the region (Box).** Indeed, multiple member economies have started or, at least, expressed their interest to locally produce EVs. For instance, Tesla received an invitation from Pakistan to establish a local EV factory, with the country promising to offer the company long-term tax breaks.<sup>27</sup> In Kazakhstan,

<sup>21</sup> While analyzing EV imports and exports of the CAREC economies, the figures only cover the data of passenger BEVs and PHEVs, and pure-electric buses. Other commercial EVs are not taken into account due to data unavailability or ambiguity of definitions.

<sup>22</sup> <https://www.huanenet.com/hskst/2041.html> (author's translation)

<sup>23</sup> <http://az.mofcom.gov.cn/article/jmxw/202305/20230503411559.shtml> (author's translation)

<sup>24</sup> <https://kun.uz/en/news/2023/05/23/uzbekistan-increases-ev-imports>

<sup>25</sup> Though many of them were re-exported to Russia. <https://thedi diplomat.com/2023/12/chinas-electric-vehicle-expansion-in-central-asia/>

<sup>26</sup> <http://tj.mofcom.gov.cn/article/jmxw/202307/20230703423388.shtml> (author's translation)

<sup>27</sup> <https://www.thenews.com.pk/latest/594004-pakistan-invites-tesla-owner-elon-musk-to-establish-factory>



several foreign EV models have been produced locally, including the ones of JAC, Hyundai, Ankaï, and Yutong.<sup>28</sup> In the Kyrgyz Republic, a statement of interest was expressed by auto industry authorities on joint production of EVs with South Korea.<sup>29</sup> In Tajikistan, the government launched an EV production plan and will soon cooperate with the PRC for its implementation.<sup>30</sup> In Uzbekistan, Volkswagen and BYD plan to locally produce EVs in near future.<sup>31</sup> Localizing EV production, from an economic point of view, not only brings down the vehicles' selling prices, but also helps the countries to generate more tax revenues along the value chain that could compensate the losses as a result of EV import tariff exemptions or reductions. Meanwhile, countries would also create new employment opportunities and benefit from extensive knowledge transfer which is deemed to be conducive to their future auto industry.

#### **Box: A SWOT analysis of the CAREC's EV deployment**

The CAREC economies enjoy a multitude of advantages and opportunities in promoting EV deployment, but at the same time face a slew of internal and external challenges that would restrain their transition to EVs. To paint a clearer picture, a SWOT analysis is thus developed. On the positive side, first, apart from the stimulative EV policies, many CAREC economies bear large reserves of critical minerals that are needed for manufacturing EVs and their core parts - batteries. Copper reserves in Kazakhstan, Mongolia and Pakistan rank around 10<sup>th</sup> worldwide, and are abundant in Afghanistan, Azerbaijan and Uzbekistan as well. Kazakhstan stands at top rankings globally also in manganese (4<sup>th</sup>), zinc (6<sup>th</sup>), nickel (12<sup>th</sup>) and cobalt (7<sup>th</sup>) reserves. Georgia is rich in manganese, Tajikistan in zinc, and Afghanistan also in zinc, nickel, and lithium. Second, tremendous renewable energy potential in wind, solar and hydro makes it possible for the economies in the region to achieve "real green" EV adoption, that is, not only about electric vehicles per se but also about the source of electricity that an EV uses to charge its battery. Third, steady growth of population, particularly as most member economies have a large proportion of young generations, can be another advantage for the CAREC region to promote EV deployment. According to the World Bank's projection, the population of the CAREC region excluding the PRC will reach 566 million by 2050, an increase of 194 million from 2022, and in all member economies except for Georgia population growth will remain positive by then. Meanwhile, the median age of the CAREC population, excluding the PRC, averaged 25.9 years in 2021, much lower than the world average age of 30.0.

In terms of disadvantages, only a few CAREC economies have mapped out comprehensive strategies specifically for national EV development, though most of them have set overall targets and announced incentives for EV transitions. At the national level, only Kazakhstan and Pakistan rolled out a separate EV (infrastructure) policy/roadmap, whilst others mentioned EV development plans only generally in their energy and/or transportation development strategies. Affordability is another obstacle for the people in the region to switch to EVs. While a report from the Rocky Mountain Institute estimates that the price of new EVs may drop to the level of ICEVs by 2030, most residents in this region can only afford second-hand imported vehicles. Limited income, conventional consumer behavior, and less stringent tailpipe emission standards are the main reasons for them to do so. Moreover, instable electricity supply induced by less efficient power system combined with seasonal factors in some parts of the region, lower hydrocarbon prices in oil and gas producing economies, extreme low temperature in winter in some parts of the economies, and shortage of charging facilities nationwide dampen many consumers' enthusiasm to change to electric vehicles. Meanwhile, relatively lower public awareness of decarbonization, and lack of knowledge of EV technology also impede the region to electrify its road transport.

<sup>28</sup> <https://primeminister.kz/en/news/reviews/production-of-electric-vehicles-new-plant-and-access-to-export-markets-development-of-kazakhstans-mechanical-engineering-in-a-new-reality>

<sup>29</sup> [https://akipress.com/news:680639:Kyrgyzstan\\_interested\\_in\\_joint\\_production\\_of\\_electric\\_cars\\_with\\_South\\_Korea/](https://akipress.com/news:680639:Kyrgyzstan_interested_in_joint_production_of_electric_cars_with_South_Korea/)

<sup>30</sup> <https://www.newscentralasia.net/2023/05/19/state-visit-of-the-president-of-tajikistan-to-china-transport-energy-and-industrial-projects-on-the-agenda-of-high-level-talks/>

<sup>31</sup> <https://daryo.uz/en/2023/07/27/uzbekistan-plans-to-produce-volkswagen-and-byd-cars>

### SWOT analysis of the CAREC region's (excluding the PRC) EV deployment

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>➤ Clear targets for road transport decarbonization, combined with a variety of tax and other incentives.</li> <li>➤ Abundant green energy resources such as solar, wind, and water (especially in Georgia, the Kyrgyz Republic and Tajikistan).</li> <li>➤ Rich in critical minerals needed for EV production.</li> <li>➤ Steady growth of population with a large group of young generations.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Lack of specific supporting policies for EV transitions in many member economies.</li> <li>➤ Inefficient power system.</li> <li>➤ Inadequate supplies of charging infrastructure.</li> <li>➤ Limited income for the majority of population to purchase EVs.</li> <li>➤ Low R&amp;D capacity on EV technologies.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>➤ Geographical proximity to key EV exporters.</li> <li>➤ Increasing demand of critical minerals for EV and battery production.</li> <li>➤ Battery as reservoir capacitors to smoothen peak and valley of the grid.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Instability of electricity supply, with a high degree of seasonality in multiple hydro-rich economies.</li> <li>➤ Low hydrocarbon prices, coupled with high fossil-fuel subsidies.</li> <li>➤ Extreme temperature in winter in some areas.</li> <li>➤ Unfamiliarity with EV technology.</li> </ul>

Source: author's presentation.

### The PRC's EV industry expanded rapidly, but the EV export to the CAREC region was limited

**The PRC continued to be one of the largest EV producers and exporters in the world.** For eight consecutive years since 2015, the PRC's production and sales of NEVs have ranked first worldwide. Domestically, the sales of BEVs and PHEVs reached 5.9 million in 2022, accounting for around 60% of the total EV sales globally. The number is expected to further increase to around 8 million by year-end 2023, according to the IEA's estimations. Globally, the PRC has replaced the US and become the world's largest EV exporter since 2021. Data from China Association of Automobile Manufacturers showed that the number of NEVs exported by the PRC reached 308 thousand units in 2021 and 673 thousand units in 2022, increasing year-over-year by 344.9% and by 120.2%, respectively. Fully year data of 2023 remain to be seen, but the number of NEVs exported by the PRC during the first eight months has exceeded the total number of NEVs exported in the full year of 2022 by 54 thousand units, to 727 thousand units.<sup>32</sup>

**Advancement of the PRC in the EV industry lies in its maturity in EV technologies and supporting infrastructure.** A recent survey by Patent Result, a Japanese patent analysis company, showed that between 2010 and 2022 the accumulative number of EV charging-related patents in the PRC ranked first worldwide at 41,011 units, 1.5 times more than that in Japan which ranked second.<sup>33</sup> Meanwhile, the PRC is taking the leading position globally in developing EV batteries, particularly in developing sodium-ion (Na-ion) batteries, which is considered to be an ideal alternative to Li-ion batteries due to its lower cost materials and avoidance of need for critical minerals. Also, the Chinese auto makers stood out in EV software technology, especially in autonomous driving technology and intelligent networking technology.

<sup>32</sup> [http://www.caam.org.cn/chn/4/cate\\_34/con\\_5236151.html](http://www.caam.org.cn/chn/4/cate_34/con_5236151.html) (author's translation)

<sup>33</sup> <https://cn.nikkei.com/china/company/52259-2023-05-04-10-10-02.html> (author's translation)

On top, the rapid deployment of charging points and battery-swapping stations guaranteed the swift transitions for electromobility in the country. Currently, the PRC has formed the largest charging infrastructure system in the world. According to the National Energy Administration, as of July 2023, the number of charging points in the country has increased by more than 60 times compared to 2016, to around 7 million.<sup>34</sup> In the meantime, the number of battery-swapping stations has exceeded 2,600, which is 1.3 times more than that in 2022.<sup>35</sup> It is estimated that the PRC will establish an even higher efficient charging infrastructure system that can meet the charging needs for over 20 million EVs by 2025.

**The boom to electrify the road transport in the PRC was strongly backed up by a series of national EV policies and incentives.** Indeed, the PRC has begun to support its EV industry systematically since the early 2000s when a feasibility report pertaining to EV development was endorsed. More comprehensive support for EV development started from 2012 when the authorities formulated a “Development Plan for Energy Saving and New Energy Vehicle Industry (2012-2020)”, which was the first national framework document for EV development (Figure 3). The Plan now has been replaced by a subsequent framework – “NEV Industry Development Plan” – designed for 2021-2035. Based on the two overarching strategic frameworks, around 50 specific policy documents came out to promote the transition to EVs in the past five years. These policies focused not only on the supply side by providing financing support such as subsidies for EV producers, but also on the demand side by offering incentives to consumers to purchase EVs. One of the most recent examples to spur domestic EV sales was the additional four-year extension of the vehicle purchase tax reduction and exemption policy<sup>36</sup> for the NEVs to the end of 2027. Since it was first introduced in 2014, the policy has been extended for three times in 2017, in 2020 and in 2022, respectively. Besides, these policies also point to optimization of charging infrastructure, facilitation of battery recycling, EV quality and security control, among others.

**Figure 3. Key EV policies in the PRC**



Source: The State Council, the PRC; author’s compilation.

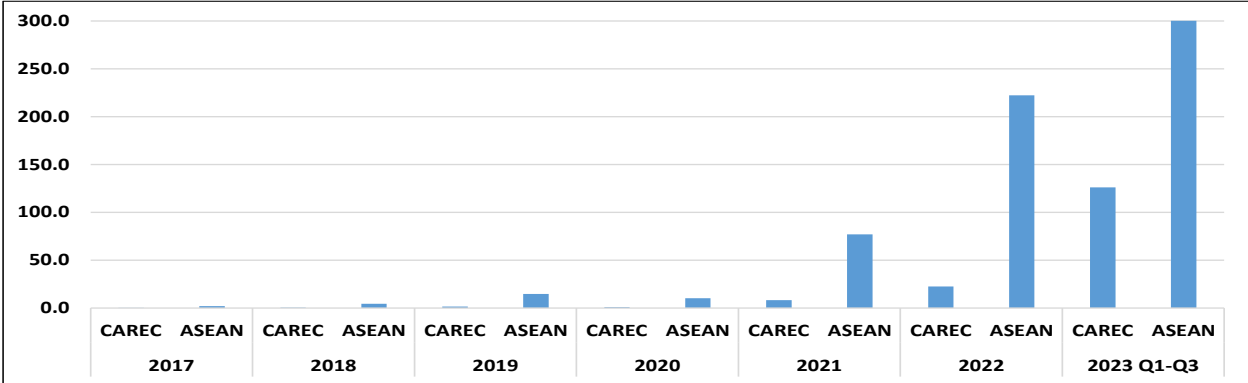
<sup>34</sup> [https://www.nea.gov.cn/2023-08/30/c\\_1310739000.htm](https://www.nea.gov.cn/2023-08/30/c_1310739000.htm) (author’s translation)

<sup>35</sup> [https://www.sohu.com/a/720029435\\_120988576](https://www.sohu.com/a/720029435_120988576) (author’s translation)

<sup>36</sup> According to the policy, NEVs purchased between 1 January 2024 and 31 December 2025 will be exempt from the vehicle purchase tax, and such tax exemption will be halved for the NEVs purchased between 1 January 2026 and 31 December 2027.

**The PRC exported much more EVs to the ASEAN region than to the CAREC region;<sup>37</sup> year-on-year growth of the latter was higher in multiple years, however.** While the PRC started to export its domestically manufactured EVs as early as 2005, the exports in large bulks began only until recent years. During 2017-23, the total number of EVs exported by the PRC to the CAREC region is seven times less than that to ASEAN, amounting to only around 60,000 units (Figure 4). Similarly, the number measured by per capita during the period was also all-time less in the CAREC region than in the ASEAN region. In 2023, for example, the PRC exported 301.4 units of EVs per million people to the ASEAN region, but only exported 126.1 units per million people to the CAREC region. Despite this, the annual growth rate of the EVs exported by the PRC to the CAREC region was higher than to the ASEAN region in 2018, 2019, 2021 and 2023 at 265.7%, 309.4%, 989.4% and 458.9%, respectively. The ultra-high growth rates to some extent point to the low base of the CAREC region, but at the same time also indicate that the market demand for EVs in the region is increasing substantially. By category, passenger car, resembling most other countries, was the major type of EVs exported by the PRC to the CAREC and ASEAN region. The number of electric buses only accounted for around 1% of the PRC's total EV exports in both regions.

**Figure 4. The number of EVs exported to the CAREC and ASEAN region by the PRC, 2017- Q1-Q3 2023, per million people**



Note: the term EVs here only refer to battery electric passenger cars, plug-in hybrid electric passenger cars, and battery electric buses; other types of EVs such as two or three-wheelers and electric trucks are not included.  
 Source: General Administration of Customs, PRC; author’s calculation.

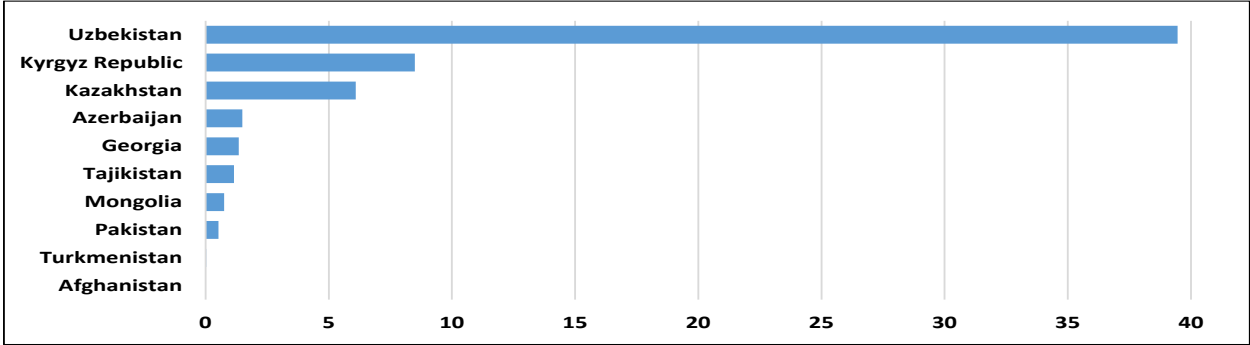
**Within the CAREC region, by total volume, Uzbekistan is the largest market for the PRC’s EV exports, whereas Turkmenistan and Afghanistan are the smallest (Figure 5).** During 2017-23, the PRC exported 39,459 electric passenger cars and buses to Uzbekistan, which was almost twice as many as the total numbers exported to other member countries. However, the largest volume of exports was seen in 2023 when the country received 30,992 EVs from the PRC, accounting for over three quarters of the total number received during the period. More recently, Uzbekistan has decided to procure another 2,000 electric buses from the PRC to accelerate the implementation of its green mobility transition strategy for public transport, and the first 200 units are expected to be delivered in 2024.<sup>38</sup> The Kyrgyz Republic and Kazakhstan are the second and third largest export destinations for Chinese EVs in the region. During 2017-23, the countries received 8,492 and 6,100 units of EVs, respectively, from the PRC. By contrast,

<sup>37</sup> The ASEAN region was selected for comparison simply because the region also consists of ten member countries as the CAREC region does if the PRC is excluded, despite still a high divergence in the size of population and economic performance. To eliminate the impact by population, the author measured the number in “per capita” approach.

<sup>38</sup> <https://m.kun.uz/en/news/2023/10/12/tashkent-city-administration-agrees-with-byd-to-purchase-2000-electric-buses>

the total number of EVs exported to Azerbaijan, Georgia and Tajikistan during the period was less than 2,000, and to Mongolia and Pakistan less than 1,000. Turkmenistan and Afghanistan are the tiniest markets for the Chinese EV exports, receiving a total of 24 and 0 unit in the past seven years. Both countries imported EVs mainly from Germany, despite rather limited demands.

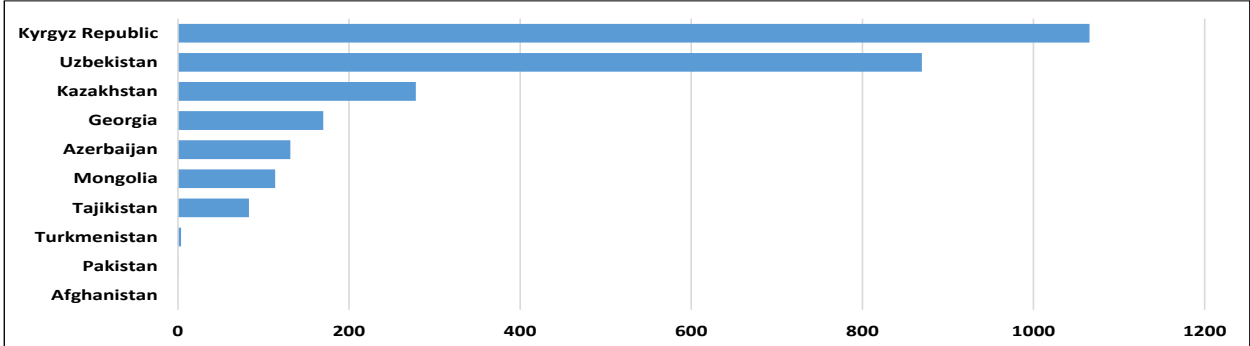
**Figure 5. The number of EVs exported to the CAREC countries by the PRC, 2017-Q1-Q3 2023, in thousands**



Source: General Administration of Customs, PRC; author’s calculation.

**As measured by per capita, the Kyrgyz Republic and Uzbekistan received much more EV exports from the PRC than others, while Turkmenistan and Pakistan received the least, except for Afghanistan (Figure 6).** In 2023, the PRC exported 1,065.5 units of EVs per million people to the Kyrgyz Republic, and 869.4 units to Uzbekistan. The per-million-people EV exports to Tajikistan, Mongolia, Azerbaijan, Georgia, and Kazakhstan were between 83.0 and 278.1 units. In comparison, the EV exports from the PRC to Pakistan and Turkmenistan were very limited, to less than 10 units per million people. Lower EV export per capita indicates that these countries still have much potential for the Chinese EV manufacturers to be penetrated.

**Figure 6. The number of EVs exported to the CAREC countries by the PRC, Q1-Q3 2023, per million people**



Source: General Administration of Customs, PRC; author’s calculation.

**The EVs manufactured by the RPC have an absolute advantage on retail prices compared to other international peers.** According to “Global EV Outlook 2023” by IEA, the average price (sales-weighted) of a small BEV in the PRC in 2022 was less than USD 10,000, whereas in Europe and in the US the price is more than USD 30,000. The huge difference is a result of lower costs in the PRC due to well-performed integration of supply chains from upstream mining processing to downstream battery and EV manufacturing, earlier access to finance for enterprises, cheaper labor, among others. The affordability,

together with the CAREC governments' supportive policies and initiatives to improve the charging infrastructure, should incentivize more people in the region to purchase EVs.

## Conclusion and policy implications

As was indicated in CAREC Energy Outlook 2030, compared with aviation and maritime transport, road transport has the largest potential for electrification via battery systems.<sup>39</sup> Given that road transport is the heaviest contributor of GHG emissions also in the CAREC region, the member countries' acceleration in the deployment of EV transitions is thus important and highly anticipated, as this will not only help fulfill the implementation of their current NDCs, but also build up confidence in setting more ambitious emission targets in the next round of NDCs<sup>40</sup> for 2035.

Unlike the PRC, the EU and the US which have been pulling ahead in electromobility, the EV transition in the CAREC region was still in an early adoption phase, despite an increasing demand in the past few years. Absence of concrete incentive policies, higher purchase and consumption costs, and lack of compatible infrastructure are the main headwinds for most member countries to carry out the transition. In some countries such as Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan, low fossil fuel price because of abundant reserves of hydrocarbon resources is another stumbling block for their EV transitions. Nevertheless, these countries have to consider what to do in case that the fossil fuels will run out sometime in the future, and that less revenues will be generated from exporting such resources as a result of a weaker external demand due to the rapid transitions to electromobility of their trading partners.

The geographical proximity to the PRC, coupled with the PRC's "go global" strategy, should facilitate the CAREC countries to electrify their road transport. However, strong support from inside the receiving countries is also indispensable for the transition. While this requires close cooperation and coordination among the automakers, it also brings a lot of "to-dos" for the policymakers. Feasible measures to promote EV deployment in the region include but are not limited to the following aspects.

- **Introduce specific policy measures to support the national EV industry, including the ones on EV and battery manufacturing, charging and swapping infrastructure, supply chain management, subsidies and other purchase incentives, and battery recycling and waste management.** Currently, most CAREC countries have no EV-related framework, if any, only a rather general one, or they were simply incorporated into their energy and/or transportation strategies. This shows weak preparedness of the region for EV transitions. More specific supporting guidelines not only encourage domestic automakers, suppliers on the value chain and consumers to be actively engaged in the EV industry, but also help avoid risks for foreign investors.
- **Strengthen domestic business environment and provide more preferential incentives for foreign investors.** Currently, the CAREC countries except for the PRC and Uzbekistan receive little EV-related foreign investments. To materialize the EV targets set and boost the domestic EV industry, bringing in foreign investments is a must, particularly given that most countries in the region are still new to EV technologies and lack of competent human resources. To this end, the CAREC

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<sup>39</sup> <https://www.adb.org/sites/default/files/publication/850111/carec-energy-outlook-2030.pdf>

<sup>40</sup> Countries should submit their next round of (I)NDCs in 2025, which will include emissions reduction targets for 2035.

countries should roll out attractive and compatible investment policies, and create a safer and fairer investment environment for foreign investors.

- **Integrate more local automakers into the global value chains for EV and battery production.** While the CAREC countries currently adopted an import approach for EV deployment, local production of EVs and batteries should be highly promoted. Bearing large reserves of critical minerals needed for EVs and batteries, automakers in most CAREC member countries can and should be engaged in the cross-border EV value chains. Locally producing EVs and batteries would bring down the overall costs and make them affordable for a broader range of consumers. At the same time, local producers will benefit from knowledge and technology transfer, which is conducive to the long-term development of a country's EV industry.
- **Incrementally phase out the fossil-fuel subsidies and shift the focus more on renewable energies.** Acceleration of EV deployment should synergize with green energy transitions. In addition to end tailpipe emissions by promoting EVs, the electricity used for charging the batteries should come from renewable energy sources such as solar, hydro and wind. Currently, six CAREC countries, namely, Azerbaijan, the PRC, Kazakhstan, Pakistan, Uzbekistan, and Turkmenistan, were still among the top 25 countries globally to provide the most fossil-fuel subsidies in 2022.<sup>41</sup> Reducing subsidies on fossil fuels while uplifting subsidies on renewables could, at least partially, resolve the issue of “green vehicle but not from green electricity”.
- **Modernize grid networks and take full advantage of the functions of batteries as reservoir capacitors through vehicle to grid technology.** On the one hand, grid networks have been outmoded in most CAREC countries. On the other hand, fast chargers,<sup>42</sup> particularly when being used simultaneously, challenge the bearing capacity of grid networks. In this sense, the economies should not only consider rehabilitating the grid networks, but also make efforts to stabilize the provision of electricity, as a stable power grid network is a prerequisite for extensive transitions to electromobility. Besides, the CAREC region is faced with severe energy efficiency issues, and multiple hydropower-dependent member countries are still short of electricity, particularly in winter when run-of-river plants are unable to respond to the increasing demand. To compensate for the electricity losses, battery energy storage technology could be brought in to maintain the electricity supply.
- **Join in international initiatives on electromobility.** More and more international initiatives and pledges on electromobility have emerged during the past decades, as the world is stepping up efforts for decarbonization. Typical ones include “Accelerating to Zero”, “Electric Vehicles Initiative”, and “EV100+”. However, most signatories are (from) advanced economies. In the CAREC region, only a few countries such as Azerbaijan and the PRC are the members of such initiatives, while others still show no presence. Participation in such initiatives and pledges not only improves the public image of a country in the international arena, but more importantly, the country can benefit from extensive collaboration with other economies in terms of knowledge and technology sharing, finance mobilization, and more chances of receiving foreign investments.

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<sup>41</sup> <https://www.iea.org/data-and-statistics/charts/value-of-fossil-fuel-subsidies-by-fuel-in-the-top-25-countries-2022>

<sup>42</sup> Fast chargers require a power rating of over 22kW and up to 350kW, while slow chargers only need power ratings less than or equal to 22kW.

- **Speed up negotiations of the pan-CAREC free trade agreement.** The PRC’s joining in the Regional Comprehensive Economic Partnership (RCEP)<sup>43</sup> substantially increased the trade flows with other member states by further eliminating tariff and non-tariff barriers. This should also account for, at least partially, the rapid growth of the Chinese EV exports to the ASEAN region in 2022-23. In the CAREC region, however, free trade agreement (FTA) currently is still limited to a bilateral or multilateral manner,<sup>44</sup> which impedes intra-bloc trade. To this end, the CAREC countries should accelerate the negotiations on the regional trade agreement, cut down the redundant transaction costs, and achieve win-win outcomes.
- **Switch the fleets to electric ones in public transport and government sectors.** Increasing the proportion of EVs in public transport and government procurement will not only generate “demonstration effect” which is likely to arouse more general public to purchase EVs, but this will also attract financing support from international donors. Globally, the PRC, the EU and the US are moving ahead of other countries in decarbonizing public transport vehicles. In its “14<sup>th</sup> Five-Year Plan (2021-2025)” for green transportation, the PRC targeted to increase the proportion of urban buses and taxis (including online ride-hailing services) in NEVs to 72% and 35% respectively by 2025.<sup>45</sup> In the EU, it proposed to achieve 100% zero-emission city bus sales by 2030.<sup>46</sup> In the US, USD 1 billion will be distributed through the Inflation Reduction Act for clean HDV replacement, including for zero-emission buses.<sup>47</sup> In the CAREC region, except for Pakistan which plans to have 50% share of bus sales electrified by 2030, no other countries announced their targets specifically for public transport electrification.

While the preceding recommendations are pivotal, other applicable suggestions include further raising public awareness for decarbonization, strengthening EV cooperation and coordination among governments and enterprises, and improving capacity building level by training relevant practitioners such as dealers and service providers.

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<sup>43</sup> RCEP is an FTA between ten member states of ASEAN and its five FTA partners, namely, the PRC, Australia, Japan, New Zealand and Republic of Korea. This world’s largest FTA has entered into force since 1 January 2022, with tariff concessions a key principle, which will eliminate 90% of tariffs within the area. The coverage area of the FTA includes trade in goods and services, investment, economic and technical cooperation, intellectual property, etc. <https://rcepsec.org/>

<sup>44</sup> [https://www.carecinstitute.org/wp-content/uploads/2023/08/A-policy-brief-on-CAREC-trade\\_for-publication.pdf](https://www.carecinstitute.org/wp-content/uploads/2023/08/A-policy-brief-on-CAREC-trade_for-publication.pdf)

<sup>45</sup> [https://www.gov.cn/zhengce/zhengceku/2022-01/21/content\\_5669662.htm](https://www.gov.cn/zhengce/zhengceku/2022-01/21/content_5669662.htm) (author’s translation)

<sup>46</sup> <https://www.iea.org/energy-system/transport/trucks-and-buses#tracking>

<sup>47</sup> <https://www.epa.gov/inflation-reduction-act/clean-heavy-duty-vehicle-program#:~:text=The%20Inflation%20Reduction%20Act%20invests,vehicles%20between%20now%20and%202031>



## Annex: Targets and policy incentives for EV adoption in the CAREC region

	Targets	Policy incentives	Policy level
<b>Afghanistan</b>	By 2030, 10% of new vehicles to the fleet must be EV tech or alternative fuel oriented.		National
<b>Azerbaijan</b>	COP26 Declaration: with joint efforts, work towards all new cars and vans sold worldwide being zero emission vehicles by 2040, and in the leading market by no later than 2035.	BEVs have been exempt from the excise tax and value-added tax since 1 January 2019, but are still subject to a 15% import duty. <sup>48</sup>	Multi-national, national
<b>PRC</b>	From 2021 onwards, the proportion of newly added NEVs including city buses, taxis, and logistics vehicles in the national ecological civilization pilot zone and public areas of the key regions for air pollution control shall not be less than 80%. By 2030, the proportion of newly added new energy and clean energy-powered vehicles will reach around 40% of new vehicle sales, in key air pollution areas 50%. By 2025, the PRC will establish a highly efficient charging infrastructure system that can meet the charging needs for over 20 million EVs.	NEVs purchased between 1 January 2023 and 31 December 2025 are completely exempt from the vehicle purchase tax; NEVs purchased between 1 January 2026 and 31 December 2027 are subject to a 50% vehicle purchase tax payment; the policy has been extended for three times since 2014 when it was implemented for the first time; BEVs, PHEVs and FCVs are eligible for the tax exemption.	National
<b>Georgia</b>	Proportion of electric passenger cars will increase to 50% by 2030, from 0.2% in 2018.	Import tax is reduced by 60% for HEVs; both import and excise tax are exempted completely for BEVs.	National
<b>Kazakhstan</b>		Transport tax is exempted for the owners of EVs; import duty is exempted; utilization fee is the lowest when registered as an EV.	National
<b>Kyrgyz Republic</b>		As of 2020, import duty for BEVs is 0. Annual registration tax is exempted for EVs.	National
<b>Mongolia</b>	Share of private HEVs increases to about 13% by 2030, from about 6.5% in 2014.		National
<b>Pakistan</b>	30% share of light-duty vehicles or	Both imported and locally	National

<sup>48</sup> <https://www.eurasiareview.com/02042021-the-electric-vehicles-market-in-azerbaijan-challenges-and-recommendations/>

	truck sales, and 50% share of bus sales will be EV by 2030, 90% by 2040.	manufactured EVs are to be exempt from the Federal Excise Duty; plant and machinery of EVs imported are duty free; EV chargers imported will attract 1 % custom duty, 0% additional custom duty; additional custom duty on completely knocked down manufacturing of EVs is to be 0%; EV producers, assemblers and suppliers, and EV-related industries enjoy only 1% Goods and Services Tax in contrast to 17% for regular vehicles.	
<b>Tajikistan</b>		EV imports are to be exempt from tariffs, the value-added tax, and the excise duty for a period of ten years. <sup>49</sup>	National
<b>Uzbekistan</b>	Share of EVs increases to 30% by 2035.	Imported EVs are exempt from the customs duties and excise tax.	National

Source: IEA, Global EV Policies; ADB, Asian Transport Outlook; SLOCAT, E-Mobility Trends and Targets

<sup>49</sup> <https://khovar.tj/rus/2023/02/tadzhikistan-uvelichil-vvoz-elektromobilej/> (author’s translation)