

Zero-emission vehicle deployment: Europe, Middle East, and Central & South Asia

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OVERVIEW

Eurasian¹ countries accounted for only 5% of the global new vehicle market in 2020, but a growing vehicle fleet is fueling increases in climate emissions and air quality impacts in the region. As Figure 1 shows, under currently adopted policies (Baseline scenario), well-to-wheel CO₂ emissions from vehicles (excluding 2&3 wheelers) will reach 1.8 billion tonnes in 2050, about 2 times the 2020 level. An accelerated transition to zero-emission vehicles (ZEVs²) in the region could instead reduce CO₂ emissions to 53% below the 2020 level by 2050 (Ambitious scenario). ZEV fleets will play an important role in reducing levels of traffic-related localized air pollution and related health effects, with especially large benefits if the region also decarbonizes its electricity grid.

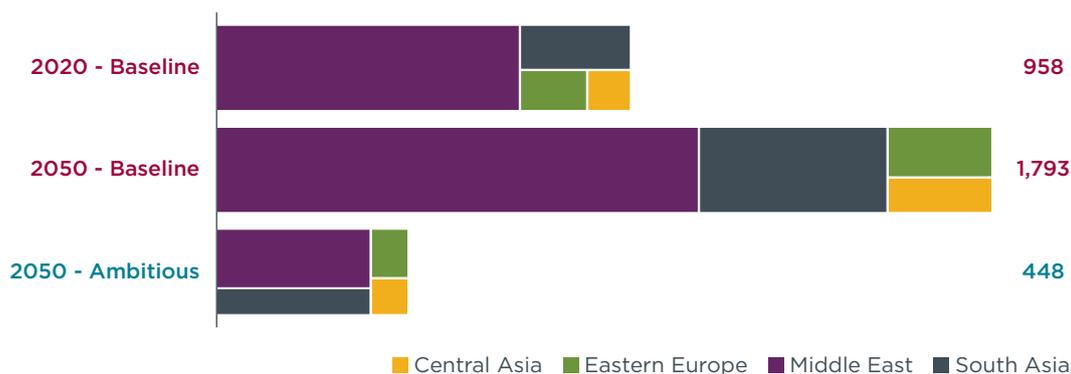


Figure 1. Estimated well-to-wheel CO₂ emissions from cars, vans, buses, and trucks in the Eurasian countries (million tonnes CO₂ per year)

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1 Eurasian region for this factsheet includes countries from Eastern Europe (excluding EU-27 countries), the Middle East, and Central & South Asia (excluding India)
 2 Zero-emission vehicle (ZEV) technology includes battery electric vehicles and fuel cell electric vehicles.

This briefing gives an overview of the status of ZEV development in the Eurasian region economies. A full version of the work and a complete list of references are available in the ICCT white paper “A critical review of ZEV deployment in emerging markets.” Sister briefings focused on the emerging markets of Africa, ASEAN markets, and Latin America can be found at theicct.org.

ZEV TRANSITION STATUS

Some developing countries in the Eurasia are scaling up electric vehicle (EV)³ sales for passenger vehicles (PVs) (Figure 2). Ukraine and Jordan have higher EV market shares than other developing countries in the region, at 1.5% and 1.1%, respectively. However, these EV shares are still lower than those in larger and more developed vehicle markets in Eurasia such as the UAE and Israel. Early signs of EV uptake are apparent in Lebanon, Nepal, Turkey, Serbia, and Belarus, with market shares between 0.1% and 0.3%. As in developing countries in other regions, EV uptake is still at a very early stage for most countries in the Eurasian region.

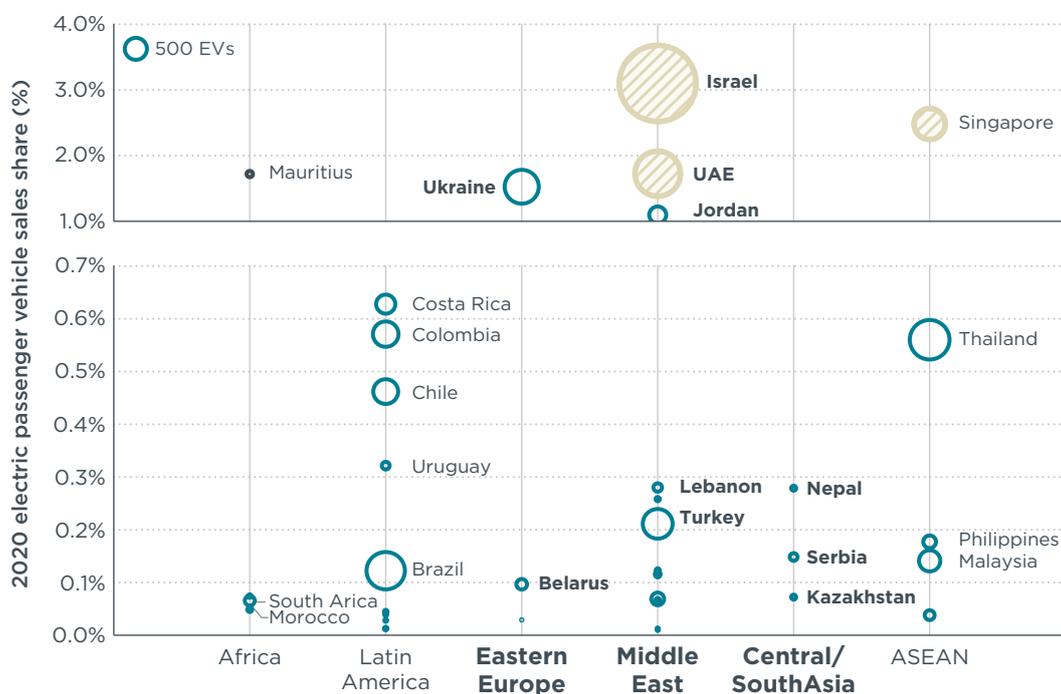


Figure 2. EV sales share (%) for passenger vehicles of non-ZEV Transition Council (ZEVTC4) countries of key regions for 2020.

Data Source: EV Volumes⁵; OICA⁶; ICCT roadmap model.

A few countries in the region have electric bus stock. Kazakhstan has a total of 230 electric buses as of 2020, a minor portion of their bus stock. Nepal, Serbia, Egypt, Turkey, Ukraine, and Belarus have fleets of 5 to 61 electric buses.

3 Electric vehicles (EVs) include battery electric vehicles, plug-in hybrid vehicles, and fuel cell electric vehicles.

4 ZEVTC, The Zero Emission Vehicle Transition Council, is made up of Ministers and representatives from some of the world’s largest and most progressive car markets and ZEV leading countries.

5 EV VOLUMES.COM The Electric Vehicle World Sales Database (2020), <https://www.evvolumes.com/>.

6 OICA International Organization of Motor Vehicle Manufacturers (2020), <https://www.oica.net/production-statistics/>.

Electric 2&3 wheelers (2&3Ws) are emerging in Eurasia, particularly in South Asia. Bangladesh has more than 1 million lead-acid battery-operated e-rickshaws⁷ and Kathmandu, Nepal has around 1,200 e-rickshaws.⁸

ZEV POLICY STATUS

A few Eurasian countries have announced non-legally binding EV targets. Targets for selected countries include:

- » **UAE:** 30% of annual procurement of government vehicles to be EVs or hybrids from 2030.
- » **Qatar:** 10% of total car population to be electric cars by 2030.
- » **Israel:** 100% of new private vehicle sales to be EVs by 2030.
- » **Kazakhstan:** produce 2000 EVs by 2022.
- » **Pakistan:** 90% of new sales of passenger vehicles, 2&3Ws, buses, and trucks to be EVs by 2040.
- » **Sri Lanka:** replace 100% of state-owned fleet (including buses) with EVs or hybrids by 2025; replace 100% of private cars and 2&3Ws with EVs or hybrids by 2040.
- » **Nepal:** 90% of sales of private passenger vehicles (including 2W) and 60% of sales of (four-wheeler) public transportation be EVs by 2030.
- » The capital cities of some countries, such as Belgrade in Serbia, Doha in Qatar, and Thimphu in Bhutan, are to set targets for electric buses and taxis within a specified timeframe.

Table 1 categorizes existing EV policies for Eurasian countries active in supporting electrification. The five broad policy categories, including regulation, incentives, infrastructure, ZEV access, and fleet deployment, are those that have proven effective in leading ZEV countries. The “Others” category summarizes actions that could be particularly beneficial for ZEV emerging countries.

Interventions by countries listed in Table 1 consist primarily of developing charging infrastructure; promoting EVs through incentives; establishing EV and battery manufacturing capacity and assembly; targeting electrification of buses and 2&3Ws; and tapping international support.

7 A.S.M. Mominal Hasan, (2020), “Electric Rickshaw Charging Stations as Distributed Energy Storages for Integrating Intermittent Renewable Energy Sources: A Case of Bangladesh”, *energies*, <https://www.mdpi.com/1996-1073/13/22/6119/htm>.

8 Shrestha S. “Nepal Policy Environment Paper”, (Urban Electric Mobility Initiative, Berlin, 2018), http://www.uemi.net/uploads/4/8/9/5/48950199/uemi_ca_nepal.pdf.

Table 1. Existing EV policies for selected Eurasian countries

Country	Phase-out target	Regulations		Incentives		Infrastructure	Demand		Industrial development		Others		
		CO ₂ standard	ZEV regulation	Subsidy/tax	In-use	Strategy/Support	Special fleet	Shared mobility	Manufacturing	Assembly	R&D and capacity building	Business model	International support
Ukraine				●	●	●		●	●			●	●
Belarus				●	●	●			●	●			●
Jordan				●		●		●					●
Egypt				●		●		●	●				●
Kazakhstan				●		●		●	●	●	●		
Uzbekistan				●		●		●	●				●
Nepal				●		●	●	●	●	●	●	●	●
Sri Lanka				●		●		●	●	●	●		●

● indicates that a given country has at least some policy actions for the given policy category

OPPORTUNITIES AND SUCCESS STORIES

- a) Manufacturing:** Some countries manufacture EVs, especially electric 2&3Ws and buses, in collaboration with international automobile companies. Hence, they have the potential to promote leapfrogging to ZEVs, and to become ZEV exporters. Countries with EV manufacturing capacity include **Belarus** (motorcycles, buses, the world’s biggest electric dump truck), **Pakistan** (solar powered 2&3Ws, PVs, and vans), **Nepal** (2&3Ws and PVs), **Kazakhstan** (buses and minibuses), and **Sri Lanka** (3W taxis). Some countries are building manufacturing plants such as **Uzbekistan** (EVs), **Serbia** (electric motors and EV battery components), **Pakistan** (PVs, 2Ws), and **Bangladesh** (2&3Ws and PVs). **Egypt** offers incentives for EV manufacturing including tax exemptions for imported components and manufacturing equipment. **Pakistan** offers various supply-based incentives that encourage growth of the EV manufacturing industry, including waived income and sales taxes on imported EV-related machinery and equipment; substantially reduced taxes on imported EV components; greenfield investments for converting domestic facilities to EV manufacturing sites, in addition to foreign direct investment (FDI) by international EV manufacturers to create their subsidiaries; and lower financing rates for EV manufacturers.
- b) Import, distribution & assembly:** Some countries have EV dealerships that import and distribute various types of EVs; examples include **Sri Lanka** and **Bangladesh** for electric 2&3Ws, and **Nepal** for electric 2Ws, PVs, minibuses, and large buses. Some countries have established EV assembly capacity in partnership with international automobile companies, as in **Kazakhstan** (buses); **Sri Lanka** (3Ws); **Pakistan** (EVs); and **Nepal** (3Ws and minibuses). Furthermore, **Sri Lanka** has a United Nations Development Program (UNDP)-supported project for producing EV components and enhancing local assembly capacity for electric 3Ws; **Bangladesh** is establishing an EV assembly plant. Some countries are incentivizing the EV assembly industry. **Egypt** offers variable reductions in customs duties on imported EV components, depending on the requirement of local content in the final product, and imposes higher customs duties for imported EVs carrying 10 passengers or more. **Pakistan** provides substantially reduced rates of sales tax on EV complete knock-down kits compared to ICE vehicles and for locally made smaller electric cars and light commercial vehicles,

while imports of completely built EVs are taxed at a high rate to promote assembly and discourage EV imports. In **Nepal**, the Government provides free land for assembly plants.

- c) **Purchase and usage incentives:** Some countries, including **Belarus, Moldova, Ukraine, Uzbekistan, Pakistan, Sri Lanka, Bhutan, Maldives, and Nepal**, offer consumer-based purchase incentives that make EVs cost-competitive with ICE vehicles. These countries either waive or reduce duties, taxes and fees on EVs, including customs duties, excise duties, import duties/surcharges, registration taxes, road/circulation taxes, goods and services taxes, carbon taxes, sales taxes, and green taxes and VAT. Additionally, **Belarus** provides a VAT rebate for consumers who purchase EVs inside the country; **Bhutan** offers an internationally supported subsidy grant and loan facility for drivers, covering 90% of the purchase price of electric taxis; and **Maldives** provides lower interest rates on loans for purchasing battery electric vehicles.
- d) EV usage incentives include monetary incentives such as waived parking fees in public parking lots and a waived public roads usage tax in **Belarus**, a 50% exemption on motorway tolls in **Pakistan**; and non-monetary incentives such as special lane provision (shared with bicycles) for electric scooters in **Turkey**, and designated EV parking spaces with constant access to charging facilities and priority parking facilities in **Ukraine**.
- e) **Charging infrastructure:** Targets, regulations, and incentives to develop a wide network of charging stations have been undertaken by some countries in the region. **Pakistan** has national targets for installing fast charging stations per 3x3 km quadrant (or every 10 sq. km) in all major cities, and every 15-30 km on all motorways, to ensure an uninterrupted power supply. **Nepal** has received international loans for the importation, installation, operation, and maintenance of EV charging stations in 50 different locations. **Turkey** put into force a regulation to provide a legal basis for installing charging stations at parking lots, fuel stations, or other places suitable for charging EVs. **Egypt** offers incentives for the importation of equipment required to establish/operate charging stations.
- f) **Shared mobility:** Some countries have targeted electrification for shared mobility modes, including buses and taxis, which are popular transportation options in many Eurasian countries and thus, have the potential for effective fleet transition to ZEVs. Buses and trolleybuses manufactured in **Belarus** are operating in seven cities and in some other countries as well. In **Ukraine**, a private company is operating electric car sharing and taxis; a ride-hailing company is operating hundreds of EVs in the capital city; a fleet of 250 electric buses was ordered under a public-private-partnership (PPP) project; and an electric bus prototype was developed by retrofitting a diesel bus. **Iran** is retrofitting conventional ICE buses to electric buses in the capital city. **Egypt** is conducting various electric bus pilot projects with support from international loans, in partnership with international organizations and EV manufacturers, and is operating electric buses after successful completion of the pilot projects. **Kazakhstan** is launching electric taxis; has purchased 100 electric buses from a joint venture of international and local manufacturers; and is conducting field trials for electric buses. **Nepal** has a private company operating electric buses; the government is introducing a fleet of electric buses in the capital city; many electric 3Ws are in use; and an internationally financed project for electric buses and taxis is under way. **Bangladesh** has more than a million electric 3Ws that are used as public transportation. **Pakistan** is introducing electric buses under PPP projects and in collaboration with international companies. **Moldova, Jordan, Kyrgyz Republic, and Nepal** have received international financing support for the purchase and deployment of electric buses.

TOP BARRIERS AND CHALLENGES

- a) **Higher EV prices compared to low-cost ICE vehicles**, which will continue to be a barrier in mass uptake unless sufficient and consistent consumer or demand-based incentives are introduced and implemented.
- b) **Lack of ZEV-related regulations**, which leave fuel economy and greenhouse gases and other pollutants unregulated, and which fail to mandate ZEV sale/purchase requirements, resulting in limited investment in ZEV technologies by the industry.
- c) **Inadequate charging infrastructure**, which limits the functionality of ZEVs.
- d) **Lack of e-mobility-based businesses** in many countries, which limits options for mass uptake of EVs.
- e) **Lack of public awareness** of ZEV benefits and operation/usage in the region.

POLICY IDEAS FOR COUNTRY COLLABORATION

- a) **Develop ZEV roadmaps, regulations, and ZEV-exclusive supply-based incentives to send clear policy signals.** A long-term roadmap, ZEV regulations such as CO₂ emissions or fuel economy standards, and ZEV production and import incentives and mandates will send out a strong development signal and encourage investment in the ZEV transition.
- b) **Reduce ZEV costs through trade agreements and international financing.** Form trade agreements with countries to lower or waive import duties on ZEVs. Introduce budget-neutral mechanisms such as charging high-emitters or introducing international financing to reduce ZEV upfront costs through rebates, reduced loan interest, and other types of collaboration.
- c) **Integrate infrastructure development with renewable energy and innovative charging solutions.** Provide countrywide charging infrastructure, supported by standards and regulations, and powered by a reliable, low-carbon energy supply, and introduce innovative charging solutions such as solar carports, to ensure a full ZEV transition.
- d) **Improve ZEV access by incentivizing the automobile industry and establishing standards and regulations.** Incentivize domestic ZEV manufacturing and assembly industries, incentivize the importation and distribution of EVs and promote localization of ZEV value chain; collaborate with international ZEV manufacturers; set technical standards and certification procedures for imported and locally manufactured/assembled ZEVs; provide mandates for ZEV purchases and gradual replacement of fleets such as buses, taxis, and 2&3Ws, as applicable.
- e) **Enable innovative e-mobility business and financing models in shared mobility.** Encourage introduction of ZEV-based businesses and cooperative finance models with a particular focus on electric buses, taxis, and 2&3Ws for ride hailing, delivery services, leasing, battery renting, and/or swapping.
- f) **Demonstrate ZEV technology through exhibitions, experience centers, and pilot projects to raise public awareness.** Collaborate with the private sector and international entities on promotion events and demonstrations of ZEVs and charging methods to increase public awareness and familiarity with ZEV technology.

INTERNATIONAL SUPPORT FOR ZEV TRANSITION

Eurasian countries are receiving loans, non-profit funds, and technical support for the ZEV transition from international agencies and philanthropic institutions including the Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), International Bank for Reconstruction and Development (IBRD), Green Climate Fund under the United Nations Framework Convention on Climate Change (UNFCCC), Nordic Environment Finance Corporation (NEFCO), Global Environment Facility (GEF), United Nations (UN), European Commission, and European Union. These organizations supported at least seven countries with approximately \$11 million in non-profit funding for the ZEV transition and six countries with \$68 million in loans for ZEV uptake and infrastructure over five years (2017-2021).⁹ Their areas of intervention included shared mobility, charging infrastructure, R&D, multiple policy interventions, and demonstration projects for ZEVs within specific fleet segments and infrastructure. The non-profit funding, on a per-country basis, ranges from \$56,000 to \$3.6 million.

Current international support is far from the levels needed to facilitate ZEV leapfrogging in the region. A five-year goal to bring cumulative ZEV sales to 10% of 2020 sales of passenger vehicles, buses, and 2&3Ws in the next five years, assuming funding at a rate of \$30 per kWh¹⁰ of battery capacity, would require a funding level of \$547 million for all vehicle segments. This is a rough estimate, but it reflects the gap between existing and needed international support. The funding could be used for various purposes including, but not exclusive to, technical support, policy interventions, infrastructure, financial incentives, R&D, and ZEV exclusive loan service to support ZEV leapfrogging in the Eurasian countries.

⁹ Statistics based on available public information. It is expected that some activities are not captured by this analysis.

¹⁰ Literature shows that the battery pack cost will be \$130-\$160/kWh by 2020-2022 and will decline to \$62/kWh in 2030. The assumed \$30/kWh funding level is a rough estimate that mimics the effort to reduce EV cost as EVs reach cost parity with conventional vehicles. Nic Lutsey and Mike Nicholas, *Update on electric vehicle costs in the United States through 2030*, Working Paper 2019-06, (ICCT: Washington, DC, 2019), https://theicct.org/sites/default/files/publications/EV_cost_2020_2030_20190401.pdf.