



Policies to Improve the Environmental Performance of Road Vehicles in the Western Balkans

Managing road vehicle emissions and
embracing e-mobility

May 2024



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² The six Western Balkan countries referred in this report are Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia.

³ Two technical reports were produced at regional level, namely (i) *Analysis of current market and policy context for road transport and related energy sectors in the Western Balkans (World Bank 2024a)*, and (ii) *Identification and evaluation of policies for managing road vehicle emissions in the Western Balkans region (World Bank 2024b)*.

⁴ World Bank Climate Support Facility (CSF). <https://www.worldbank.org/en/programs/climate-support-facility>

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Executive Summary

Maintaining economic growth in the Western Balkans (WeBa), while avoiding locking in an environmentally unsustainable development trajectory, requires decisive policy action in multiple sectors, with transport being one of the most critical. This includes addressing the growing energy consumption and emissions from transport, not only due to environmental imperatives, but also to reap benefits on human health from reduced local pollution and increased energy security from lower reliance on fossil fuel imports. Transport currently accounts for 15 percent of the WeBa region's greenhouse gas (GHG) emissions and is the fastest growing emitting sector: road transport is responsible for 99 percent of the sector's domestic¹ emissions.² Transport – and in particular, road transport – accounts for around 70 percent of oil consumption in the region. As motorization levels are expected to continue to rise alongside economic growth in the near future, this implies an anticipated increase not only in GHG emissions, but also in local pollutants affecting air quality. In the region, air pollution contributes between 4 to 19 percent of total premature mortality in WeBa cities (Daul, Kryzanowski, and Kujundzic 2019). Additionally, fossil fuel consumption in transport contribute to the deficit in the trade balance of the WeBa region, which is strongly dependent on oil and oil product imports, adding to significant challenges in energy security for the region.

Addressing these challenges requires urgent policy action that aligns with WeBa's economic and social development goals. To this end, countries in the WeBa can leverage two main categories of policies: (i) instruments that improve the environmental performance of **internal combustion engine vehicles (ICEVs)**, having an impact on both the legacy stock and new registrations, and (ii) instruments that can effectively prepare the region for a transition towards **electric mobility (e-mobility)**. The former need to pay particular attention to used vehicle trade given the significant weight of second-hand imports (over 80% of the total annual registrations), its energy use, and its emissions of local pollutants and CO₂. The latter are especially important due to the course of action taken by the European Union (EU) on climate policy, its wide-ranging implications for economic and industrial development, the weight of the EU in terms of trade for countries in the WeBa, cultural proximity, and mutual geopolitical interests.

Policies fostering a transition towards cleaner vehicles in the WeBa must be: (i) effective, from an energy efficiency, environmental, and safety perspective; (ii) economically viable, and therefore budget-neutral, if not net positive (i.e. generating revenues) from a governmental perspective; (iii) equitable and socially sustainable; and (iv) able to mobilize private investment, which could in turn enhance economic and social viability/sustainability).

A range of policy solutions can allow the WeBa countries make significant progress towards a cleaner and more technologically advanced vehicle fleets, addressing not only environmental but also fiscal and equity-related aspects. Policy priorities include a combination of regulatory requirements, vehicle and fuel taxation reforms, and policies that specifically support e-mobility. A

¹ Excluding international aviation and maritime.

² World Bank team analysis based on data from Climate Watch CAIT, the Kosovo Environmental Protection Agency, and the International Energy Agency (IEA).

summary of these measures, prioritized according to the discussion developed in this policy note, is included in table ES1.

Table ES1. Summary of Seven Policy Instruments Discussed in this Brief and Level of Prioritization

Policy Actions	Priority	Policy Area Group
Introduce regulations on energy efficiency/carbon dioxide (CO ₂) emissions per kilometer (km) and stricter regulations on emissions of local pollutants for secondhand vehicle imports.	TOP	Regulatory requirements
Introduce fleet level electric vehicle (EV) requirements and other measures for the early transition for highly utilized vehicles	TOP	E-mobility
Implement differentiated vehicle taxation based on environmental performance where this is not already the case	HIGH	Vehicle and fuel taxation
Increase fossil fuel taxation, alongside redistribution measures to respond to equity-related challenges.	HIGH	Vehicle and fuel taxation
Improve governance and enforcement of roadworthiness procedures and technical inspections	HIGH	Regulatory requirements
Develop a clear policy framework for EV charging infrastructure	HIGH	E-mobility
Introduce regulations on energy efficiency/CO ₂ emissions per km and stricter regulations on emissions of local pollutants for new vehicles	MEDIUM ³	Regulatory requirements

Note: These policy packages are based on the screening and multicriteria assessment of over 30 policy measures that could be applicable to the WeBa region.

Going forward, each WeBa country requires a tailored transition pathway and implementation agenda to work out the details and timing of road vehicle fleet decarbonization. Each policy reform shall consider country-specific market dynamics, equity and economic implications, and political economy aspects. At the same time, a regional approach with joint coordination and alignment could help maximize environmental benefits and accelerate regulatory convergence with the EU and within the WeBa.

International stakeholders are crucial to increase the level of ambition and accelerate the timeline for the green growth agenda. Key players include the Transport Community Permanent Secretariat, the Energy Community, and the EU. The Transport Community and the Energy Community have a central role to support countries in the WeBa to align their legislation with the European policy framework and the *acquis communautaire*.⁴ The EU has a key role to support these Communities in fostering these efforts. These activities will need to move beyond the current scope of action, integrating measures that implement the Climate Law.

The EU can also develop policies capable to facilitate the task of WeBa countries to manage environmental impacts and enhance energy efficiency for road transport vehicles. These include the facilitation of access to WeBa countries to information contained in the EUCARIS⁵ database (or its update, via the MOVE-HUB electronic system), and by finalizing the EU end-of-life vehicle regulation. WeBa countries could also harness opportunities for industrial development via strategic partnerships with the EU on sustainable raw materials and electric battery projects in the priority action for EU integration.

³ Due to a greater proportion of secondhand vehicle purchases in less wealthy segments of the population, and considering equity challenges, coordinated action on regulatory requirements for both new vehicles and secondhand imports will be preferable.

⁴ The EU “*acquis communautaire*” covers all treaties, EU legislation, international agreements, standards, court verdicts, fundamental rights provisions and horizontal principles in the treaties such as equality and non-discrimination. All member states and their citizens must obey the *Acquis* and all candidate countries must accept the full *Acquis* to become a member of the European Union.

⁵ EUCARIS is the European car and driving license information system.

Furthermore, WeBa countries could draw on support from organizations that can catalyze investments that promote sustainable transport, clean energy, climate action, digital technologies, and human capital development. Partnerships supporting the green growth and air quality agendas may also be pursued with international institutions such as the World Bank, the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the United Nations Development Programme (UNDP) and bilateral donors. The World Bank stands ready to support WeBa countries with knowledge and technical assistance towards designing and rolling out road vehicle decarbonization and e-mobility policies, conducting thorough fiscal analysis, and potentially coupled with policy and investment lending.

Introduction

Countries of the Western Balkans (WeBa) are facing an opportunity to maintain economic growth while also tackling the rising environmental and social challenges emanating from high polluting sectors, including transport. This would avoid locking in an environmentally unsustainable development trajectory. However, this cannot be done without decisive and urgent policy action. Transport currently accounts for 15 percent of the region's GHG (greenhouse gas) emissions and is the fastest growing emitting sector; road transport accounts for 99 percent⁶ of the sector's domestic emissions.⁷ As motorization levels rise alongside economic growth, so too will the region's GHG and local pollutant emissions. Policies that improve the environmental performance of road vehicles and that align with the region's economic and social development goals could address this challenge.

The EU climate and economic agenda, set by the recently adopted EU Green Deal,⁸ is a crucial factor in the WeBa countries' EU accession ambitions. The EU Green Deal aims to achieve climate neutrality by 2050, including a 90 percent reduction in transport-related emissions by 2050 (compared to 1990 levels). Through the 2020 Sofia Declaration, the WeBa region reached an important milestone by endorsing the Leaders' Declaration on the Green Agenda, which is meant to be aligned with the EU Green Deal (Regional Cooperation Council 2020). This alignment is reflected in the WeBa Sustainable and Smart Mobility Strategy (SSMS WB) (Transport Community 2021), developed by the Transport Community Permanent Secretariat in concert with regional Ministries of Transport, the European Commission, and the Regional Cooperation Council. This SSMS WB includes a regional priority objective of "boosting the uptake of zero-emission vehicles, renewable and low-carbon fuels, and related infrastructure" that sets initial policy direction to the region.

To address the transport sector's environmental challenges related with the road vehicle fleet, countries in the WeBa can leverage two main categories of policies taking into account fiscal considerations: (i) instruments that improve the environmental performance of internal combustion engine vehicles, having an impact on both the legacy stock and new registrations, and (ii) instruments that effectively prepare the region for the transition towards e-mobility.

This policy note intends to expand the WeBa's knowledge on road vehicle emissions to inform WeBa countries, development partners and other regional and local stakeholders on policy options to manage road vehicle emissions while also considering fiscal implications. In particular, this note suggests evidence-based policy actions that can, at once: i) address and manage environmental, energy security, and affordability impacts of existing vehicles, taking into account fiscal considerations; ii) steer new vehicle integrations in the existing fleet—including in particular secondhand vehicle imports—towards better environmental and energy efficiency; iii) enable countries in the WeBa to embrace e-mobility; iv) ensure that the transition to e-mobility is socially and economically inclusive; v) and support the EU accession process by converging with the relevant *acquis communautaire*.

⁶ Excluding international aviation and maritime.

⁷ World Bank team analysis based on data from Climate Watch CAIT, the Kosovo Environmental Protection Agency, and the International Energy Agency (IEA).

⁸ COM/2019/640 final. The European Green Deal.

Road Vehicles in the Western Balkans: An Emerging Source of Emissions

The transport sector’s reliance on fossil fuels contributes to the WeBa region’s trade balance deficit, thus impacting regional energy security. The WeBa region is highly dependent on oil and oil product imports, with only Albania and Serbia having their own production of oil. Even in Albania and Serbia, domestic production remains lower than consumption. Transport—and in particular, road transport—accounts for around 70 percent of oil consumption in the region (with all countries having shares above 55 percent, as shown in Figure 1. Gasoline and diesel account for almost 75 percent of the region’s total oil products consumption (Figure 2) (World Bank 2024a).

Figure 1. Oil and Oil Product Consumption by Sector in Western Balkans Countries, 2019

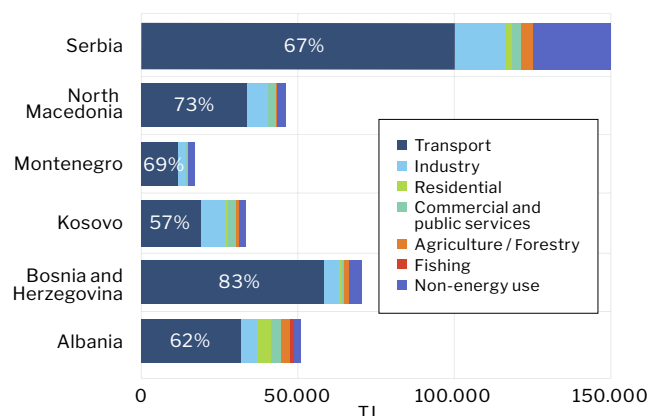
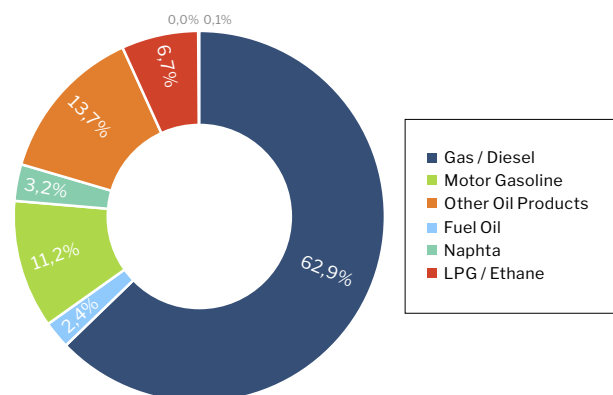


Figure 2. Share of Oil Consumption by Product in the Western Balkans, 2019



Sources: Figure 1: Albania Institute of Statistics 2023; Agency of Statistics of Bosnia and Herzegovina 2023; Statistical Office of Montenegro 2022; State Statistical Office of the Republic of North Macedonia 2023; Ministry of Interior of the Republic of Serbia 2022; Kosovo Agency of Statistics 2023; Figure 2: IEA 2022b.

The transport sector currently accounts for 15 percent of the region’s GHG emissions, with 99 percent⁹ of domestic transport emissions coming from road transport (Figure 3). Transport GHG emissions have grown both in absolute terms (more than doubling between 2000 and 2019) and as a share of total emissions (15% in 2019 vs. 7% in 2000) (IEA 2022a). Sector emissions are expected to continue to rise alongside economic growth and rapidly increasing car ownership. While vehicle ownership is still significantly lower than the EU average (290 vehicles per 1,000 inhabitants vs. 563 for the EU in 2022), the region saw an average increase of 55 percent from 2012 to 2022, with marked increases in Albania and Kosovo (122 percent and 94 percent growth respectively). This compares to 17 percent growth in car ownership in the EU during the same

⁹ Excluding international aviation and maritime.

period (figure 4). While similar increases at the regional level have taken place for light commercial vehicles (up 59 percent from 2010 to 2020) and heavy trucks (up 42 percent from 2010 to 2020), buses have seen instead a less pronounced growth (up 33 percent from 2010 to 2020).

Figure 3. Western Balkans Motorization Rates 2012-2022

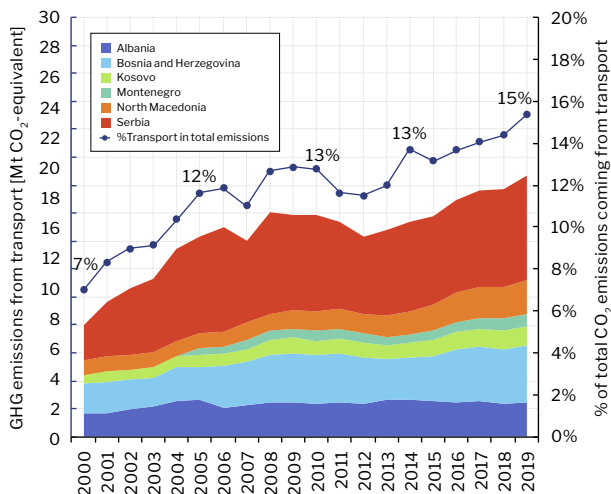
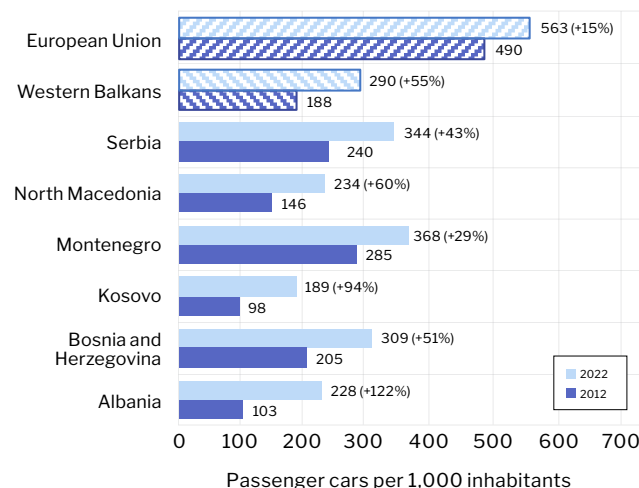


Figure 4. GHG Emissions from Transport by Country



Sources: Figure 3: IEA 2022a; Figure 4: Albania Institute of Statistics 2023; Agency of Statistics of Bosnia and Herzegovina 2023; Statistical Office of Montenegro 2022; State Statistical Office of the Republic of North Macedonia 2023; Ministry of Interior of the Republic of Serbia 2022; Kosovo Agency of Statistics (2023).

Secondhand vehicles, mostly from the EU, are the bulk of imports and represent over 80 percent of the imported passenger cars across the WeBa (IEA 2022). For buses and trucks, data available for Serbia also point to lower, but still high, shares for secondhand imports (around 70 percent). Countries in the region import mainly cheap passenger cars, with values ranging between EUR 3,000 and 9,000 (Ecologic Institute, Fraunhofer ISI 2019), comparable with cars imported to Bulgaria and Poland and below the EUR 9,350 assessed for the EU average in 2014 (European Commission 2014). Data available for Albania indicate that the price of secondhand passenger cars is, on average, around a fifth of that of a new passenger car (World Bank 2024a). Lower values are often paired with older vehicles, subject to weaker limits of emissions of local pollutants, as shown by the fact that cars in Serbia, which still allows Euro 3 imports (as shown in table 1), are at the lower end of the price range (World Bank 2024a).

The high proportion of diesel-fueled and old vehicles in the fleet, combined with lenient minimum emission standards (table 1), results in higher emissions of local pollutants per distance travelled across the WeBa in comparison with the EU. Even if emissions from heavy-duty vehicles (buses, heavy trucks and medium trucks) decreased in the region from 2015 to 2020 (IEA 2022) as a result of stricter local pollutant emission standards beginning sooner for Heavy-Duty Vehicles (HDVs) (Euro VI since 2012) compared with passenger cars (Euro 6 since 2015), poor air quality will remain a major problem for cities in the region. Air pollution in cities in the WeBa often exceed World Health Organization (WHO) recommended thresholds (World Bank 2024d), and nine out of the 15 most polluted cities in Europe in 2022 were in the WeBa, according to the World Air Quality Report 2022 (IQAir 2022). Air pollution is estimated to cause 4 to 19 percent of total premature mortality and reduce life expectancy by 0.4 to 1.3 years in WeBa cities

(Daul, Kryzanowski and Kujundzic 2019), with costs exceeding an estimated 8 percent of GDP in the extreme case of Bosnia and Herzegovina, in 2016 (World Bank 2024c). Transport is one of the main contributors to air pollution in urban areas in the WeBa, typically after heating and energy generation, with example estimates of 30 percent of fine particulate matter (PM_{2.5}) emissions in Sarajevo Canton coming from the transport sector (World Bank 2024d).

Table 1. Minimum Emission Standard for New and Used Vehicles

Country	Age limit for secondhand vehicles	Light Duty Vehicles (LDV)		Heavy Duty Vehicles (HDV)	
		New	Used	New	Used
Albania	15 years (for HDV only)	5	4	V	III
Bosnia and Herzegovina	7 years	6	5	VI	V
Kosovo	10 years	-	4	-	IV
Montenegro	-	6	4	VI	IV
North Macedonia	-	6	4	VI	IV
Serbia	-	5	3	V	III

Source: World Bank 2024a.

A Case for a Transition towards Cleaner vehicles and E-Mobility

The overview above flagged important energy security, GHG emission, air quality and trade-related challenges associated with road transport vehicles in the WeBa. This is accompanied by a rapid development of road transport electrification in the EU and other major global economies (IEA 2023), causing – alongside other aspects of the energy transition (namely the falling cost of renewable energy) – rapid and highly impactful changes in policymaking and technology adoption. This means also that the energy transition is expected to lead to major industrial and socio-economic implications. Combined with the structural interest of both the EU and WeBa countries to move towards greater economic integration – including via EU accession, these considerations point to the necessity to accelerate a successful transition towards e-mobility and low-carbon, low-cost electricity generation in the WeBa. The case for this acceleration is also underpinned by the clear opportunities that e-vehicles offer to pair environmental (urban air quality and life-cycle GHG emissions), energy security and economic gains, especially if e-mobility is first adopted by vehicles with lower total cost of ownership.

An accelerated transition towards e-mobility in road transport, powered by renewable electricity, is cheaper compared to alternative decarbonisation technologies. Embracing this transition in a timely manner will be important to minimise risks of job losses due to a significant industrial transformation. For example, policies and investment incentives that seize opportunities along the value chains of e-mobility technologies could help manage the structural shifts resulting from declining demand for carbon-intensive goods and services, in particular the shift from employment from traditional vehicle manufacturing towards battery production, electricity supply and related investments (Tamba, Krause, Weitzel et al. 2022). These considerations are especially relevant for countries in the WeBa with a sizable automotive industry,¹⁰ and due to the lack of mechanisms fostering innovation, alongside skill and knowledge gaps, leading to higher risk exposure for industries in the region (OECD 2020).

While the transition to e-mobility is needed in the medium term, early action to reduce the emissions from internal combustion engine vehicles can yield significant air quality benefits and reduce dependency on imported oil. Even under an accelerated e-mobility transition scenario, most of the fleet and new registrations in the short term will continue to consist of ICEVs. Hence, reducing the high social and economic costs of transport-related air pollution in urban areas requires targeting the environmental performance of ICEVs. Improved vehicle emission standards and fuel quality can significantly reduce harmful pollutants such as nitrogen oxides and particulate matter. For instance, a Euro 6 diesel car emits 84 percent less nitrogen oxides (NO_x) and 91 percent less particulate matter (PM) per kilometer driven compared to a Euro

¹⁰ In the Western Balkans, this is the case for Bosnia and Herzegovina, North Macedonia, and Serbia. These are characterized by the presence of producers of electrical components, mechanical components, plastic, textile, software, design, specialized production, and surface protection. The most relevant original equipment manufacturer (OEM) assembling vehicles is Fiat Chrysler Automobiles (FCA), in Kragujevac, Serbia. North Macedonia hosts several, primarily foreign-owned, automotive suppliers and the Belgian bus manufacturer, Van Hool. Volkswagen produces a range of vehicle parts in Sarajevo, Bosnia and Herzegovina.

4 vehicle (World Bank 2024b). More efficient ICEVs will also consume less gasoline and diesel and reduce dependency on foreign oil.

Cost competitiveness, geographical proximity to the EU market, and close trade ties with EU member states and other countries in the European regional value chain are factors that could help WeBa countries harness the growth potential of the emerging European e-mobility value chain, with positive spillovers on job creation (a key requirement in a context where technologies related with internal combustion engines experience a regional decline). As in the case of other emerging economies (Cazzola and Santos 2023), opportunities also derive from:

- i. Significant shares of fleet vehicles with high rates of daily usage, including taxis, buses, and light commercial vehicles.
- ii. Greater consumer interest for smaller electric vehicles (EVs), including two-wheelers, the suitability of these vehicles to be supplied by the existing electricity grid, and possibilities for two-wheeler producers (including e-bikes) to expand into electric vehicles.
- iii. Potentially higher interest, with respect to the EU, for maintenance and servicing shops in the repowering/repurposing of combustion vehicles into electric vehicles, and the possibility, for these entities, to evolve from small-scale enterprises into larger scale manufacturing and assembly facilities, including in the case of buses.

Finally, the full alignment of national legislation with that of the EU, and its full and effective implementation, are among the requirements for EU membership. Under the Transport Community Treaty (TCT), WeBa countries committed to transpose several key transport-related EU directives and regulations within fixed timescales, as listed in annex I of the Treaty. Table 2 summarizes the extent to which legislation in annex I of the TCT related to this study (i.e., related to road vehicle regulation, taxation and e-mobility) has been transposed into national legislation in the WeBa region, showing very limited progress so far (except for a few exceptions such as Roadworthiness Directive and the Fuel Quality Directive).

Key challenges will need to be overcome, calling for both policy action and voluntary commitments by private sector stakeholders. These include:

- i. An inherent inertia of the vehicle stock replacement, although this is mitigated by a dynamic growth of the vehicle stock observed in the recent past.
- ii. A limited focus on energy efficiency, possibly due to constrained household incomes (requiring strategies to ensure greater affordability for electric vehicles) and to costs of capital that are higher than the EU average (requiring strategies to ensure greater availability for affordable investments, both by institutional and private sector stakeholders).
- iii. Limited regulatory oversight, not only requiring stronger environmental policy but also enhanced enforcement capacity.

Table 2. Status of Adoption of Selected EU Legislation
(Listed in the Transport Community Treaty – Annex I) (by November 2022)

Vehicle regulations	Albania	Bosnia and Herzegovina	Kosovo	Montenegro	North Macedonia	Serbia
Type approval Regulation 2018/858 ¹¹	Not transposed	Not transposed	Not transposed	Not transposed	Not transposed	Not transposed
Roadworthiness Directive 2014/45/EU ¹²	Fully transposed	Not transposed	Fully transposed	Fully transposed	Fully transposed	Fully transposed
Roadside inspection Directive 2014/47/EU ¹³	Fully transposed	Not transposed	Fully transposed	Fully transposed	Not transposed	Partially transposed
Vehicle registration Directive 1999/37/EC ¹⁴	Not transposed	Not transposed	Fully transposed	Fully transposed	Not transposed	Fully transposed
Directive on end-of-life vehicles 2000/53/EC ¹⁵	Fully transposed	Partially transposed	Partially transposed	Partially transposed	Not transposed	Partially transposed
Euro standards for road vehicles: Regulations (EC) No 715/2007, ¹⁶ and 595/2009 ¹⁷	Not transposed	Not transposed	Not transposed	Not transposed	Not transposed	Not transposed
Carbon emission regulations: Regulation (EU) 2019/631 ¹⁸	Not transposed	Not transposed	Not transposed	Not transposed	Not transposed	Not transposed

■ Not transposed
 ■ Partially transposed
 ■ Fully transposed

Source: World Bank 2024a.

¹¹ Regulation on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles.

¹² Directive on periodic roadworthiness tests for motor vehicles and their trailers and repealing Directive 2009/40/EC.

¹³ Directive on the technical roadside inspection of the roadworthiness of commercial vehicles circulating in the Union.

¹⁴ Council Directive on the registration documents for vehicles.

¹⁵ Sets out specific rules and regulations for the management and disposal of vehicles at the end of their life cycle.

¹⁶ Euro 6 standards for light passenger and commercial vehicles.

¹⁷ Euro VI standards for heavy duty vehicles.

¹⁸ Regulation (EU) 2019/631 setting CO2 emission performance standards for new passenger cars and vans.

Opportunities to Foster an Inclusive Transformation

WeBa countries can leverage **two main categories of policies** to address challenges related to their road vehicle fleets: (i) policy instruments **that improve the environmental performance of internal combustion engine vehicles**, having an impact on both the legacy stock and new registrations, and (ii) policy instruments that effectively prepare the region to manage the **transition towards e-mobility**. The first category of policies must particularly consider the significant proportion of secondhand imports (over 80 percent of the total) in the region and their relevant energy use and emissions. The second category of policies is especially important given the course of action taken by the EU on climate policy, its wide-ranging implications for economic and industrial development, the weight of the EU in terms of trade for countries in the WeBa, and mutual geopolitical interests.

Any policy action to improve the transport sector in the WeBa must assess and address equity-related challenges. These include, for example, higher vehicle costs for households with relatively lower incomes compared to the EU average. In this respect, it is encouraging to observe that vehicle price gaps are only marginally affected by pollutant emission after-treatment technologies, especially for secondhand vehicles.¹⁹ It is important to note that energy efficient vehicles also tend to provide net equity benefits from a Total Cost of Ownership basis, since the cost savings from lower fuel consumption offset the higher vehicle acquisition cost to a larger extent than for new vehicles.²⁰ On the other hand, higher upfront costs and slower depreciation rates for electric vehicles (Rush, Zhou, and Gohlke 2022)²¹ may require attention. The focus should be on both affordability and availability, including for secondhand vehicle imports.

Overall, policies fostering a transition towards cleaner vehicles in the WeBa, need to be: (i) effective from an energy efficiency, environmental, and safety perspective; (ii) economically viable, and therefore budget-neutral, if not net positive (i.e. generating revenues) from a governmental perspective; (iii) equitable and socially sustainable, i.e. capable to effectively address affordability limitations; and (iv) able to support the mobilization of private investments, which would in turn support economic and social goals.

¹⁹ A clear advantage is that the Euro 6 (for light vehicles) and VI (for heavy vehicles) pollutant emission regulations have been in place for more than a decade in the EU, meaning that vehicles with far lower negative impacts on air quality are available at price points that are well below what they were in earlier years. Additionally, most of the cost increase is due to better vehicle conditions, and not to enhanced pollutant emission after-treatment technologies (which only account for a fraction of the vehicle cost). Targeted redistributive measures may still be relevant to manage the higher acquisition cost of more recent secondhand vehicles, even if depreciation cost differentials shrink with increasing vehicle age.

²⁰ The most efficient passenger cars within a given market segment generally cost 5-7 percent less at retail purchase (as new vehicles) than the average vehicle in that segment (European Commission 2019). This adds to additional opportunities to limit the fuel consumption of vehicles by changing attributes like size and footprint (European Commission 2019), helping avoid risks of regressive effects from policies aiming to improve energy efficiency.

²¹ Recent research shows that there are signals that electric vehicles depreciate less than combustion vehicles.

Key Policy Options

Table 3 summarizes prioritized²² key policy tools available to WeBa governments to address the challenges related to the road vehicle fleet to date and seize opportunities related to e-mobility. The table differentiates between (a) vehicle and fuel tax reforms, (b) regulatory requirements, and (c) policies to accelerate e-mobility. It also includes broad indications of policy instruments suitable for these categories. Greater details on specific instruments, including considerations on their prioritization (top-, high-, and medium-priority) given the specific circumstances of countries in the WeBa, are discussed in the following sections.

Table 3. Key Policy Options to Foster an Inclusive and Environmentally Sound Transformation for Road Transport in the WeBa

Policy Areas	New registrations		Existing vehicle stock
	New vehicles	Secondhand imports	
A. Vehicle and fuel taxation reforms			
Differentiated vehicle taxation based on environmental performance	Through both registration and circulation ²³ taxes ²⁴		Through circulation taxes only
Increase fuel taxation	Impacting usage profiles of all vehicles, with stronger price signals for vehicles with poorer energy efficiency and higher levels of direct CO ₂ emissions/km ²⁵		
B. Regulatory requirements			
Energy efficiency/CO ₂ emission and pollutant emission regulations	Suitable for both new vehicles and secondhand imports, with vehicle importers as regulated entities		-
Roadworthiness and technical inspections	Included in vehicle type approval process and related technical regulations	Leveraging vehicle type approval regulations and requiring additional roadworthiness checks	Through requirements on periodical technical inspections
C. Policies to accelerate e-mobility rollout			
Early transition for highly utilized vehicles	Through regulatory requirements, incentives and/or fees specifically targeting vehicles with these usage profiles (e.g., taxis, ride sharing, mail delivery vehicles, buses), based on environmental performance		Via retrofitting programs, possibly supported by incentive programs ²⁶
Policy framework for EV charging infrastructure	Through regulatory requirements, incentives, and infrastructure-related investment plans by public authorities, and also leveraging first the case of highly utilized vehicles		-

²² Taking stock of international best practice, previous experience in the region and neighboring countries, as well as extensive consultation with multiple stakeholders in the region via workshops and interviews, a set of more than 30 potential policy interventions was considered. Through a multicriteria screening process considering environmental, economic, and equity impacts, as well as implementation barriers/viability, the shortlist of policy actions presented here was defined.

²³ Circulation or ownership taxes are recurrent (annual) taxes or charges to be paid by vehicle owners.

²⁴ Circulation or ownership taxes are more likely to require equity-related redistribution measures, especially for low-income households and small businesses lacking access to alternatives modes of transport than cars or trucks.

²⁵ Fuel taxes may also require equity-related redistribution measures, especially for capital-constrained households and small businesses that are more likely to rely on older and less energy efficient vehicles, and especially in cases where their access to alternatives modes of transport than cars or trucks is limited.

²⁶ Most relevant for capital-constrained households and small businesses, especially in cases with limited access to alternatives.

A. Vehicle and fuel taxation reforms

Pricing and/or taxation instruments are key prerequisites to achieve, at once, environmental, energy security, and budgetary goals (Cazzola and Santos 2023; IEA 2018; International Transport Forum 2021). For example, such instruments can lead to improved air quality and vehicle performance by internalizing climate and air pollution impacts from road transport in line with the *polluter-pays principle*. They can also raise fiscal revenue that can be dedicated to transport, environmental, and distributive policies. Instruments falling in this category include differentiated taxation based on environmental performance of vehicles, summarized in figure 5, as well as carbon pricing and fuel excise duties, summarized in figure 9. These measures are discussed in the following sections.

Differentiated vehicle taxation based on environmental performance

Taxes on the purchase or registration of a vehicle are widely applied in Europe, even if the fiscal schemes, which are prerogative for each EU member state, are heterogeneous. For example, purchase or registration taxes for passenger cars and motorcycles are applied in most EU member states, often with differentiation based on environmental performance.²⁷ A purchase/registration tax is levied in a significant number of European countries on light commercial vehicles, while only a minority of European countries applies purchase/registration taxes for heavy vehicles (World Bank 2024a).²⁸ Most of the EU countries apply taxes on vehicle ownership, and almost all EU countries charge Heavy-Goods Vehicles (HGVs) and most charge passenger cars (ACEA 2022). Taxes typically vary depending on engine size and CO₂ emissions; fuel type, emission class, vehicle weight and engine power are also relevant parameters (European Commission 2019).

The nature and differentiation parameters on vehicle taxation vary largely among countries also in the WeBa, but with environmental performance not yet playing a key role. Taxation is based on flat rates irrespective of environmental performance in Albania (with a differentiation for luxury vehicles), Bosnia and Herzegovina, and Montenegro. No taxation is applied in Kosovo and Serbia (World Bank 2024a). In 2020, North Macedonia was the first country in the WeBa to introduce a tax to promote improved fuel economy and lower carbon dioxide (CO₂) emissions for passenger cars, including secondhand imports (as detailed in box 1). The use of this approach for passenger cars in North Macedonia is the best practice currently applied in the region and can serve as a blueprint for other countries in the region to use fiscal reforms to improve environmental performance of passenger cars and light commercial vehicles.

While it is unlikely to be sufficient on its own to trigger transformative changes in powertrain choices, vehicle taxation based on the environmental performance of vehicles can lead to significant changes in consumer choices (see example of North Macedonia in box 1) and is therefore classified as “HIGH” priority (Figure 5).

²⁷ Exceptions include Bulgaria, Czechia, Estonia, Germany, Lithuania, Luxembourg and Sweden, where no purchase tax on passenger cars is levied (ACEA 2022). Registration taxes on motorcycles are also not applied in Romania and Switzerland.

²⁸ These include France, Ireland, Italy, Poland, Romania, and Greece. Denmark also applies registration taxes for buses and HGVs, but only up to 4 tons, meaning that, in practice, most HGVs are exempted from purchase taxes in Denmark (European Commission 2019).

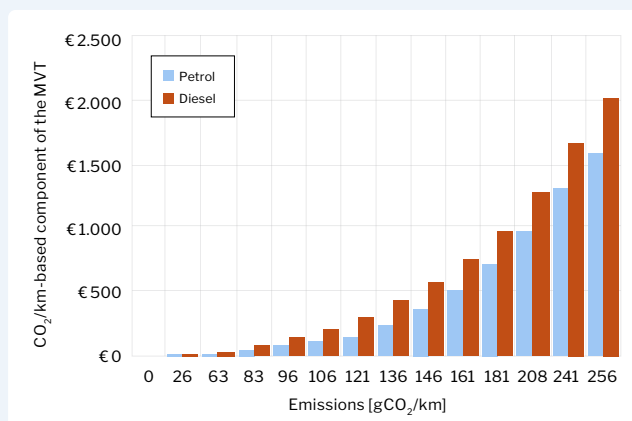
Figure 5. Differentiated Taxation Based on Environmental Performance of Vehicles.

Policy Measures	
Reform of vehicle registration tax with higher rates for vehicles with higher CO ₂ /km and higher pollutant emissions	
Reform of vehicle circulation tax with higher rates for vehicles with higher CO ₂ /km and higher pollutant emissions	
Assessment	
Environmental Impact	<ul style="list-style-type: none"> Important to provide price signals to consumers. The case of North Macedonia shows that impacts on consumer choices can be significant. Emission savings occurring over time, through vehicle stock replacement and/or growth.
Economic and distributional Impact	<ul style="list-style-type: none"> Cost impacts for vehicle users depend on the details of the reform, and generally lead to net savings in a total cost of ownership (TCO) due to energy efficiency improvements. Unlikely to be sufficient on its own to trigger transformative changes in powertrain choices but can support vehicle electrification.
HIGH PRIORITY: Important for countries with taxation structures that are not differentiated based on environmental performance.	

Box 1. Vehicle Registration Tax Linked to Levels of CO₂ Emissions in North Macedonia

A motor vehicle tax is applied in North Macedonia the first time a vehicle is registered in the country, both for new and secondhand vehicle imports. In 2020, this tax was reformed to promote fuel economy for passenger cars with the adoption of the Motor Vehicle Tax Law. The reform introduced a specific tax component to account for the vehicle’s CO₂ emissions (gCO₂/km) with increasing rates per unit of emission for more pollutant vehicles (Figure 6), in addition to a tax component dependent on the vehicle value. The reform also included a full exemption from the motor vehicle tax for battery electric vehicles.

Figure 6. Tax Amount for CO₂ of Petrol and Diesel Vehicles in North Macedonia (EUR)



The reform of passenger car taxation was intended to at least maintain the level of revenue from vehicle tax while addressing equity aspects, enabling citizens who have little purchasing power to buy vehicles with better environmental and higher energy efficiency standards. It led to significant decreases of market share for energy inefficient vehicles and increased purchases of more environmentally friendly vehicles. Average CO₂ emissions per km of cars (including new and secondhand) were reduced by 21 percent in 2022, compared to prereform levels. The reform also generated net increases in tax revenues: more than a doubling in 2022 vs. 2019 (Mazhenkovski 2023). Despite initial opposition by car importers, acceptability levels significantly increased once the tax reform was implemented.

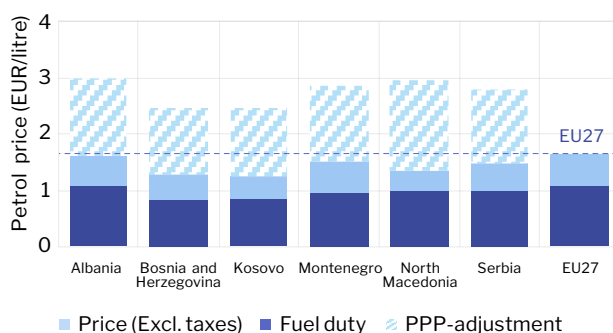
Increasing fuel taxation

Fuel taxes (including excise duties, value-added taxes (VAT), and carbon pricing mechanisms) comprise some of the tools enabling to provide price signals and orienting choices towards less energy intensive vehicles while increasing fiscal revenue. Fuel taxes are common in many countries, but with very different rates. Higher taxation rates are relevant and more common for net importers of oil and oil products due to the negative impact of oil imports on a country's trade balance. This is the case in the WeBa and in the EU, even if there are still differences between rates applied in specific countries and the EU average or the values proposed in the EU Energy Taxation Directive. Price signals from fuel taxes are likely to have greater impact on environmental performance and tax revenues than vehicle taxation reforms, as fuel taxes not only impact the purchase of new vehicles, but they also reduce the activity of the existing fleet.

While alignment with the proposed EU Energy Taxation Directive could help raise tax revenues in some countries the WeBa, room for fuel tax increases in the region might be limited, given the current tax levels (already high, if compared with other emerging economies) and the purchasing power in the region (which is lower than the EU average). Petrol and diesel prices in the WeBa are in most cases lower than the EU average in nominal terms, but are higher than the EU average when adjusting for purchasing power parity (World Bank 2024a) (see figures 7 and 8). Given the circumstances of individual WeBa countries, reforms of road transport fuel taxes are recommended only when there is a need to align with the EU Energy Taxation Directive,²⁹ and as long as the reforms can generate additional fiscal revenues to be reinvested in the economy. Any negative equity implications arising from this policy should be carefully assessed and addressed, for example with redistributive budget allocations and measures to foster a fair technology transition, as well as less carbon intensive transport modal options such as non-motorized transport, public transport, rail, and inland waterways.

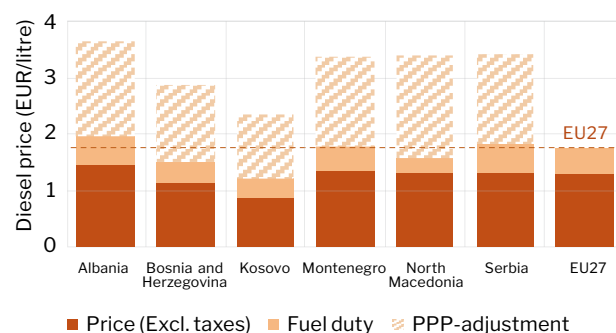
Even if specific circumstances limit the extent and scope of fuel taxation reforms in the WeBa, they are important to provide price signals to consumers and are therefore classified as “HIGH” priority (Figure 9). In particular, fuel taxes have important long-term influence on the size, weight, fuel economy and CO₂ emissions of vehicles, ultimately promoting energy efficiency (IEA 2019).

Figure 7. PPP Corrected Petrol Prices (in EUR/liter) in WeBa Countries and Compared to the EU27 (Avg. 2022 Price)



Source: World Bank 2024a.

Figure 8. PPP Corrected Diesel Prices (in EUR/liter) in WeBa Countries and Compared to the EU27 (Avg. 2022 Price)



²⁹ This is the case of North Macedonia tax on diesel, which ranges between 0.25-0.30 EUR/Liter (L), hence below the 0.33 EUR/L EU Energy Tax Directive minimum. If the proposed revision of the directive is considered, i.e., 0.39 EUR/L for diesel, also Kosovo (0.36 EUR/L) and Bosnia and Herzegovina (0.36 EUR/L) would fall below the directive minimum.

Figure 9. Increasing Fuel Taxation

Policy Measures	
Fuel Taxation (Carbon Pricing, Excise Duties)	
Assessment	
Environmental Impact	<ul style="list-style-type: none"> Compared to vehicle taxation, an increase in fossil fuel prices could lead to lower GHG emissions and improved air quality, as prices affect both the vehicle purchase decision for new registrations and activity levels for the existing fleet (veh-km).
Economic and distributional Impact	<ul style="list-style-type: none"> A substantial increase in fuel taxation might impact heavy duty vehicles the most. Equity implications heavily depend on allocation of revenue: fuel tax increases are, in principle regressive, unless corrected by tax revenue allocation.
<p>HIGH PRIORITY: Level of prioritization dependent on fiscal margin of maneuver. Suitable for countries with fuel tax rates below the EU Energy Taxation Directive or below EU average.</p>	

B. Regulatory requirements

Regulatory requirements offer major opportunities to enhance the potential impact of pricing mechanisms and tax reforms. In the WeBa, regulatory developments are also important to align policy frameworks with the EU *acquis communautaire*, something that is and will remain a necessary condition for EU integration. *Regulatory requirements to manage road vehicle emissions and foster e-mobility can be divided in two main groups: (i) energy efficiency/CO₂ emissions per km and emissions of local pollutants;*³⁰ and (ii) roadworthiness and technical inspections, which are especially relevant for the used vehicle trade, and not for new vehicles at the time they enter the stock (see table 3).

Regulations on energy efficiency/CO₂ emissions per km and emissions of local pollutants

Regulations on energy efficiency/CO₂ emissions per km and emissions of local pollutants can be applied to both new vehicles and secondhand imports. Figures 10 and 11 summarize relevant regulatory policy tools targeting energy efficiency and emissions, the supporting enablers, and the impacts they have on environmental and economic indicators, paired with an overall assessment of their priority level in the WeBa. Figure 10 specifically focuses on secondhand imports, while figure 11 addresses new vehicles. Both sets of policy tools are applicable to different modes of transport, with the caveat that regulatory texts need to be mode-specific (due to major differences in enabling instruments, such as performance measurement tests, and also in mission profiles (average travel distances), with impacts on cost/benefit analyses).

Given the large share of imported secondhand vehicles in the WeBa road vehicle stock and the likelihood for used imports to continue to be relevant in the future, regulatory developments focused on secondhand vehicle imports (figure 10) have a higher priority than those focusing on new vehicles (Figure 11).³¹ At the same time, due to a greater presence of second-hand vehicle purchases in less wealthy portions of the population, and taking into consideration equity challenges, coordinated action on regulatory requirements for both new vehicles and secondhand imports is preferable. A parallel intervention on new and secondhand vehicles shall also be important to enhance public acceptability. For example, targeted compensatory measures may

³⁰ Carbon monoxide, nitrogen oxides, particulate matter, and volatile organic compounds.

³¹ Regulatory measures on new vehicles may also potentially induce an unintended shift to secondhand vehicles if regulations on the latter are not applied.

be necessary for specific segments of the population, such as households in rural areas, as these could be particularly exposed to increases in secondhand vehicle costs and face constrained access to alternative modes of transport. However, compensatory tools shall consider that support for personal vehicle purchase is a lower priority than other forms of social protection (e.g. subsidies for public transport and cycling).

Separate regulatory measures should be implemented for energy efficiency/CO₂ emissions and for the emissions of local pollutants, as shown in figures 10 and 11. Measures affecting only local pollutants do not necessarily have sizable impacts on CO₂ and energy efficiency, as they can be largely dealt with through exhaust aftertreatment technologies. Covering only pollutant emissions would leave major policy gaps to be filled. On the other hand, measures focused on energy efficiency/CO₂ emissions per km can have positive spillover effects for local pollutants, especially in cases where they promote the market introduction of vehicles with zero tailpipe emissions.

Several enabling actions are needed to ensure that regulatory measures on emissions work effectively. As shown in figures 10 and 11, actions that are common for regulations on both new and used vehicles include (i) technical procedures needed to measure performance; (ii) labelling/consumer information instruments; (iii) data tracking on vehicle attributes (and, for secondhand imports, on their maintenance history); and (iv) measures needed to ensure that fuel quality requirements are also effectively met, as these are essential to ensure that pollutant emission aftertreatment technologies work effectively. In the specific case of regulation of used vehicle imports, an additional enabling action is considered: (v) improved governance of the vehicle inspection and emission control tests, as part of vehicle roadworthiness procedures. Further details on these enablers are discussed in the next section.

Figure 10. Regulatory Measures on Energy Efficiency/CO₂ Emissions per Km and Emissions of Local Pollutants for Used Vehicles

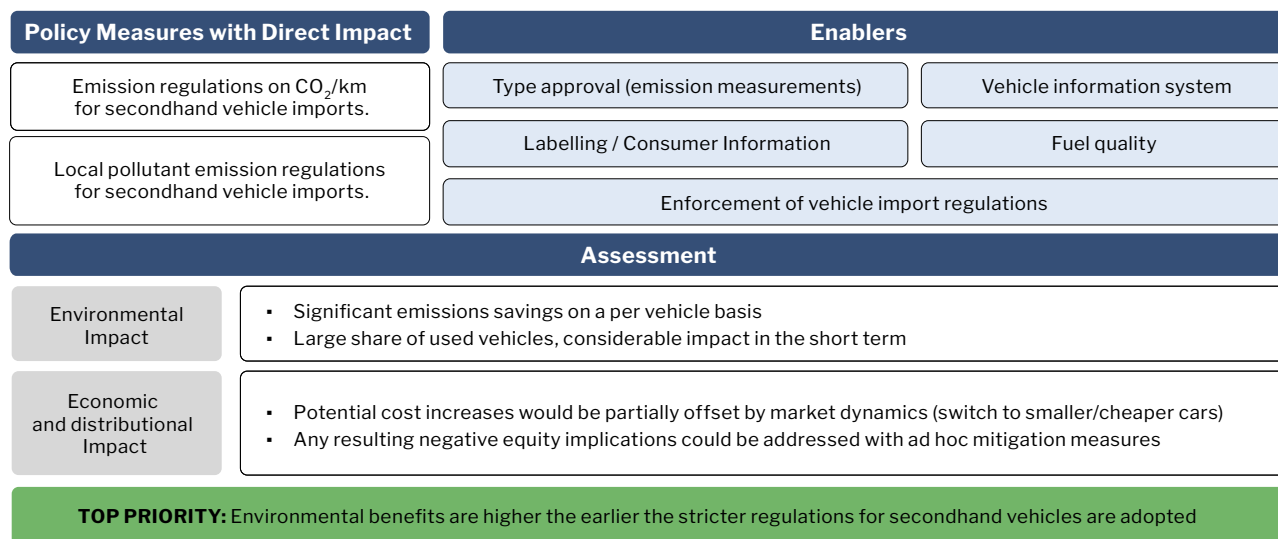
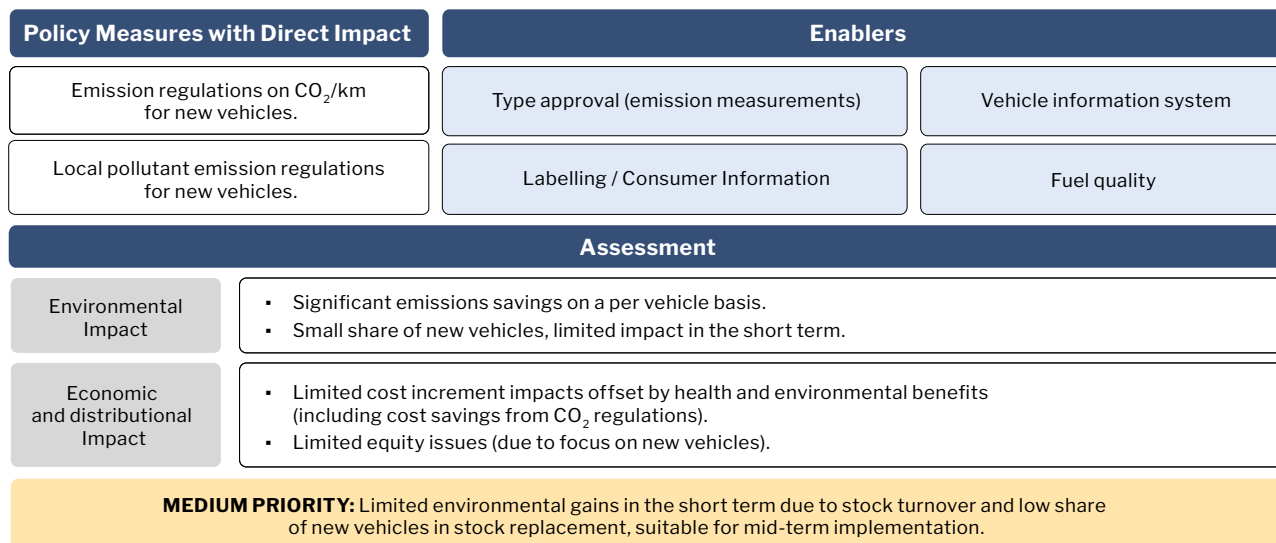


Figure 11. Regulatory Measures on Energy Efficiency/CO₂ Emissions per Km and Emissions of Local Pollutants for New Vehicles



For the WeBa, specific measures fitting with the framework outlined in Figure 10 and Figure 11 include:

- Regulatory requirements addressing specifically the energy efficiency and CO₂ emissions of imported secondhand vehicles.** These are not currently in place in any of the WeBa countries. Nevertheless, there is already a concrete example of a policy framework that adopted this solution, in New Zealand (Waka 2023). This framework consists of regulations on CO₂/km paired with differentiated taxation on vehicle registration, with both measures applicable to secondhand passenger car imports.³² The combination of regulatory and fiscal policies used in New Zealand effectively addressed differences across the type of importers (as regulated entities), including with respect to volumes of vehicles traded and company size. It can serve as a blueprint for future policy development in the WeBa, reinforcing the case of differentiated taxation already applied in North Macedonia.³³
- A reform of existing bans for secondhand vehicle imports to ensure that thresholds are based on Euro pollutant emission regulations and are stricter over time.** In particular, the fact that vehicles homologated according to the Euro 5/V and earlier regulations are by now older than 10 years makes a case for a rapid leapfrog to Euro 6/VI. The National Air Protection Program for Serbia envisions an increase in the minimum regulatory requirement from the current Euro 3/III standards to Euro 6/VI by 2025 (Government of the Republic of Serbia 2022).
- Gradual alignment with the EU legal framework on CO₂ and pollutant emission regulations (Euro 6/VI and eventually Euro 7/VII) for new light- and heavy-duty vehicles.**

³² In the case of New Zealand, the differentiated taxation is framed as a bonus/malus or feebate (combining fees and rebates) scheme. This is suboptimal in countries with lower income levels due to equity-related considerations (as only the higher income fractions of the population have access to personal vehicles). Pairing regulatory instruments with differentiated taxation based on environmental performances, rather than feebates, is a better approach for lower income countries to address equity aspects.

³³ This can be implemented with specific targets on the average of CO₂ emissions per km of secondhand vehicles imported on a given year and complemented with a charges and credits scheme. Alternatively, this can take the form of upper energy use or CO₂ emission thresholds per km, differentiated based on weight or footprint, for any vehicle being imported in the secondhand market. The latter would be much simpler to implement in WeBa countries as it requires a simpler accounting and enforcement process (avoiding the need to develop own accounting of averages by the importers (regulated entities) and the absence of a charge and/or credit scheme).

CO₂ emission regulations for passenger cars could be designed as a transitional scheme at regional level to facilitate the eventual adoption of carbon emission regulations at the EU level. CO₂ emission regulations for heavy vehicles also require a transition strategy, as they are already enforced in the EU and are currently being updated (European Commission 2023a). This transition will need to account for the fact that the rate of adoption and commercial maturity of low-carbon technologies for heavy vehicle segments is lower than for light vehicles. It will also need to account for major opportunities for an early shift towards electric vehicles in specific heavy-duty applications, starting from urban passenger transport, with buses (UITP 2021), in line with the EU Clean Vehicles Directive and possibly even exceeding its requirements, and from freight deliveries (German Federal Ministry for Digital and Transport 2020).

As discussed in the section on opportunities to foster an inclusive and environmentally sound transformation, equity implications of regulatory policy choices are particularly pertinent in the WeBa due to the region's relatively low income levels compared to EU member states. For example, attention needs to be paid to equity and distributional considerations of reforms that make secondhand vehicles more expensive. A key advantage, in this respect, comes from the limited weight that energy efficiency and exhaust emission aftertreatment technologies have on vehicle prices, in comparison with other parameters (especially vehicle size and power), which helps to offset the price impacts of stricter regulations through small changes to the choice of vehicle size and power.

Roadworthiness and technical inspections

Legal frameworks ensuring the roadworthiness of the fleets with respect to vehicle emissions are insufficient in WeBa countries. Evidence collected through interviews with different government stakeholders suggests that emission controls are not systematically performed for secondhand vehicle imports and, when they are, resulting data are not used to enforce secondhand vehicle import regulations on minimum emission standards (World Bank 2024b).¹⁵

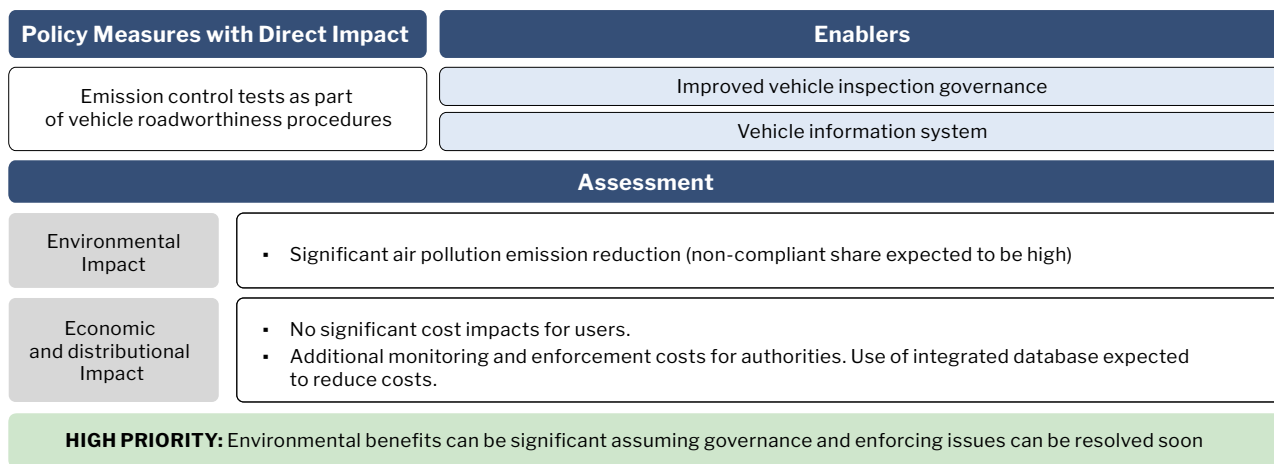
Ensuring that countries in the WeBa can effectively monitor emissions of secondhand vehicle imports is a priority. Figure 12 outlines key enablers to improve the roadworthiness of used vehicle imports and their environmental and economic implications. Ensuring access to high quality vehicle technical data and maintenance records, already covered by the EUCARIS database (the European car and driving license information system) or an updated version of it (such as the MOVE-HUB electronic system envisaged by the recent proposal of an end-of-life vehicle regulation by the European Commission (European Commission 2023b)) is critical for the WeBa to develop and enforce effective legislation controlling secondhand vehicle imports.³⁴ Access to these databases could effectively reduce resources dedicated to homologation validation and technical inspection for vehicles imported from the EU, enabling a better governance of vehicle inspections (World Bank 2024d).³⁵ Improved governance of inspections is expected to significantly reduce burden to the public administration of vehicle inspection enforcement. Introducing minimum requirements that should qualify a used vehicle as safe to be exported or imported, in line with the objectives of the Safer and Cleaner New and Used Vehicles of the

³⁴ There is no precedent to date of granting access to EUCARIS to non-EFTA (EFTA: European Free Trade Association) members. Thus, the Transport Community and the European Commission have a key role in facilitating access to EUCARIS, working together with WeBa national authorities.

³⁵ In particular, EUCARIS data on digital certificates of conformity would streamline the homologation validation process, while data on periodic roadworthiness tests would reduce the need for additional technical inspections for secondhand vehicles. Other vehicle data such as vehicle registration document, license plate, mileage, and vehicle owner, would also facilitate documentation checks for secondhand vehicles registration in Western Balkans countries.

World Forum for the Harmonisation of Vehicle regulations of the United Nations,³⁶ would also help compliance efforts in the region by preventing non-compliant vehicle from being imported, supplementing opportunities that could already arise with access to EUCARIS and, when ready, the MOVE-HUB electronic system. This is also the case for the restriction of exports from the EU to roadworthy vehicles only, already included in the recently proposed EU end-of-life regulation, updating a directive dating back to 2005.

Figure 12. Measures Enhancing Roadworthiness, Focused on Used Vehicle Imports



C. Policies to accelerate e-mobility rollout.

Progress towards cleaner vehicles and e-mobility needs to be supported with policies capable of kickstarting and accelerating a transition that may struggle to materialize due to upfront cost barriers. This section focuses on two key areas to spur the transition:

- **Highly utilized vehicles can be a key enabler of cost-effective EV deployment across different modes of transport, ultimately driving private investments.** This is due to higher savings from energy costs likely offsetting higher upfront expenditures, even in cases with comparatively higher cost of capital (often a characteristic of emerging economies). These policies can also stimulate early investments in the deployment of charging infrastructure. Thus, policies focusing on highly utilized fleets are considered to be a “TOP” priority (figure 13).
- **Enhanced infrastructure access is also an important enabler of the transition to electric vehicles, as access to chargers has been shown to correlate positively with electric vehicle adoption.** The cost-effective transition of highly utilized fleets can also help spearhead the installation of chargers (Figure 14), essential to broaden the scope for an increased adoption of EVs in the region (“HIGH” priority), and that can be obtained with participation of the private sector.

Early transition for highly utilized vehicles

Policies supporting a rapid transition to e-mobility of highly utilized fleets include dedicated requirements for specific services (e.g. buses, taxis, and urban delivery vehicles). Such policies could also integrate retrofitting programs, thus creating opportunities for local enterprises to intercept part of the EV manufacturing value chain (Figure 13).³⁷

³⁶ <https://unece.org/transport/vehicle-regulations/world-forum-harmonization-vehicle-regulations-wp29>

³⁷ The World Bank position paper (2024) “Serbia: A Pathway to Electric Mobility” recommends a retrofit program as an affordable way to electrify bus fleets.

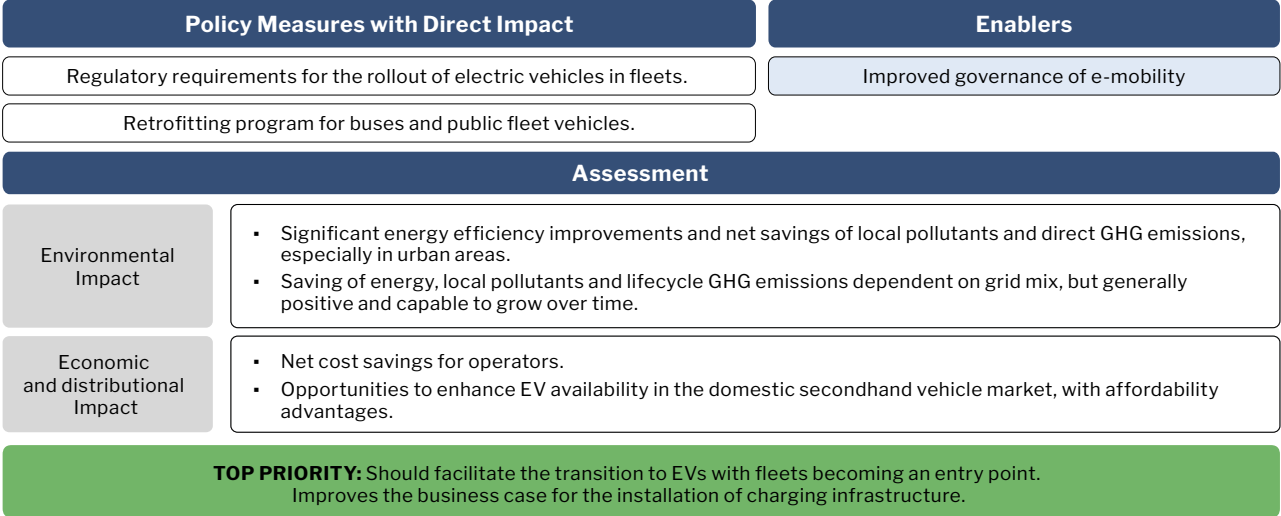
There are already isolated examples of good practices in the WeBa. For example, the Municipality of Tirana, Albania, gave priority to recently produced and environmentally friendly (electric, hybrid and Euro 6) vehicles for access to additional taxi licenses. Starting in 2016, this has led to increasing investments by several operators to deploy electric vehicles and invest in charging infrastructure (EnerNETMob 2021). Another example, on the industrial development side, is the recent announcement of early steps for local EV production in Bosnia and Herzegovina (N1 Sarajevo 2023).

Despite isolated examples, the region lacks coordinated and planned action. In addition, the responsibility for promoting electric vehicles and for regulating and deploying charging infrastructure is not well defined in WeBa countries. To overcome this problem, key recommended actions are:

- Prioritize the establishment of dedicated entities or coordination platforms to lead the development of required legal and policy frameworks pertaining to e-mobility and charging infrastructure, including a national plan, a strategic roadmap, the definition of policies, regulations, and coordination with other government agencies, industry stakeholders, and the public (World Bank 2024b).¹⁵
- Introduce regulatory requirements for the rollout of electric vehicles in public fleets (e.g. buses, taxis, car-sharing services, and light commercial vehicles) to support equitable and self-sustaining EV deployment.
- Pair the requirements above with requirements and/or incentives specifically targeting electric vehicles in the context of regulations on energy efficiency and CO₂ emissions per km, both for new vehicles (in line with what has happened in the EU) and secondhand imports (building on the case of the Clean Car Standard adopted in New Zealand).

Introducing EV-specific in differentiated taxation schemes for vehicle registrations can also support these regulations. Taxation measures should be conceived as temporary to avoid risks of budgetary shortfalls, and shall be complemented by a plan to introduce road user charges (Cazzola and Santos 2023; International Transport Forum 2021; IEA 2019; Cazzola, Bunsen, Fulton et al. 2021).

Figure 13. Measures Focusing on the Transition towards Electric Mobility of Highly Utilized Vehicles



Charging infrastructure

Improved governance and policy frameworks are also important to foster private and publicly accessible EV infrastructure. Adding to technical standardization and licensing of charging points to facilitate implementation and interoperability for vehicle fleets, specific policy actions (Figure 14) include:

- Technical specifications on private charging infrastructure targets for off-street charging infrastructure in public garages and new private/renovated private garages, in line with those of the EU Energy Performance of Buildings Directive.
- Regulations with targets and technical specifications on publicly accessible charging infrastructure in line with those of the Alternative Fuels Infrastructure Directive.

Figure 14. Measures Focusing on Charging Infrastructure Deployment.

Policy Measures with Direct Impact		Enablers
Regulatory requirements regarding the rollout of publicly accessible charging infrastructure or EVs.		Governance of the vehicle inspection
Infrastructure program targeting highly utilized vehicles.		
Regulatory requirements for off-street charging infrastructure.		Framework for private investment
Assessment		
Environmental Impact	<ul style="list-style-type: none"> • Significant emissions savings on a per vehicle basis, thanks to correlation between EV charger deployment and EV adoption, if paired with other measures supporting the latter. • Energy efficiency improvements and net savings of local pollutant and GHG emissions, even if still depending on grid mix. 	
Economic and distributional Impact	<ul style="list-style-type: none"> • Significant investment, largely dependent on power capacity and hence intended use. • Financial support would be expected from public authorities, decreasing over time. 	
<p>HIGH PRIORITY: Setting an adequate and coherent policy framework for EV infrastructure is urgent in the short term to ensure a cost-effective roll out of charging infrastructure, with private participation, ultimately reducing the costs for public authorities.</p>		

The Transport Community Strategy for Sustainable and Smart Mobility in the WeBa also refers to the need to leverage private funds and public-private partnerships to ensure rapid deployment of charging infrastructure (Transport Community 2021). Supporting measures include facilitating administrative procedures to obtain installation licenses and setting adequate pricing regulation to ensure commercial viability, as they would reduce the costs to businesses and reduce deployment times (World Bank 2024d). An efficient use of resources could also be ensured by creating hubs of shared charge points for highly utilized fleets, improving utilization rates (World Bank 2024d).

Other policy tools supporting e-mobility

Ensuring that supply chains are adequately and sustainably developed is critical to support the e-mobility transition. Doing this requires taking a life-cycle approach, making sure that mineral extraction supports the transition without causing environmental damage, and making provisions for recycling facilities for battery materials (Cazzola and Santos 2023; International Transport Forum 2021; Global Fuel Economy Initiative 2021). Including electric vehicles in green investment frameworks is also another important step that shall be added to e-mobility policy frameworks in the WeBa, and one where coordinated action with multilateral development banks could make a positive impact (Cazzola and Santos 2023). See box 2 for further policy recommendations to accelerate e-mobility from the World Bank study *Serbia: A Pathway to Electric Mobility* (World Bank 2022).

Box 2. Focus on the Case of the E-Mobility Roadmap for Serbia

The World Bank’s 2024 report, *Serbia: A Pathway to Electric Mobility* analyzes Serbia’s e-mobility enabling environment and provides recommendations and steps to establish an efficient e-mobility market that contributes to the sustainable development of the country.

The sequence shown in table 4 reflects the priorities identified by the e-mobility roadmap for Serbia. These include the creation of a governance structure, followed by adequate institutional, regulatory, and planning frameworks. These steps also align with the prerequisites for measures specifically targeting highly utilized fleets (Figure 13) and for charging infrastructure (Figure 14). The electrification of buses, passenger vehicles, and truck fleets are identified as the next priority actions, for Serbia, showing an alignment with the top priority attributed to the transition of highly utilized vehicles in Figure 13 and the discussion developed in the section on highly utilized vehicles in this policy note. The rollout of charging stations and adjustments of the grid capacities are the next step in the roadmap for Serbia. Charging infrastructure is also marked as “HIGH” priority.

Table 4. Activities Prioritized in the E-Mobility Roadmap for Serbia.³⁵

Priority no	Activity Name and Number	Costs	Impact	Timeframe
FUNDAMENTAL				
1	1. Establishing governance structure and concept for the market model	Low	High	Year 1
2	2. Development of an adequate regulatory framework	Low	High	Year 1
3	3. Development of an adequate planning framework	Low	Medium	Years 1 - 2
DECARBONIZATION OF VEHICLE FLEET				
4	4a. Support decarbonization of the bus fleet	High	High	Year 1 start
5	4b. Incentivise decarbonization of private cars	High	High	Year 1 start
6	4c. Support decarbonization of public fleets and freight transport	Medium	Medium	Year 1 start
7	4d. Incentivise deployment of recharging network	High	Medium	Year 1 start
ENERGY and CROSS CUTTING				
8	6. Decarbonizing the energy mix and ensuring power grid adequacy	High	High	Years 1 - 9
9	5. Switching to electrified transport modes (trams, rail, etc.)	High	High	Years 1 - 9
10	7. Social measures	Low	Low	Years 1 - 9
11	8. Human capital, industry, research and development	Medium	Medium	Years 1 - 9

Conclusion

Key findings: a need for action both for internal combustion engines and for e-vehicles

Curbing emissions by transitioning to more environmentally sustainable road transport is crucial for WeBa countries to dampen the rising health and environmental costs of reliance on traditional ICE vehicles, as well as to enhance energy security. Moving away from the legacy of highly polluting ICE vehicle technologies – currently constituting the vast majority of vehicles on the roads in the WeBa – and the fossil fuels that they use – gasoline and diesel – is essential to seize this opportunity.

Enhanced policy action is necessary not only to seize opportunities for societal cost savings, but also to respond to increased pressure from major technology developments at the global level, clearly pointing towards increased electrification of road vehicles.³⁸ Global developments already show a surge in market shares of electric vehicles across all modes of transport, starting from light vehicles, including buses and likely to expand rapidly to trucks. All major economies – including China, the EU and the United States – have already adopted clear policy and investments signals, aiming to actively manage this technology transition, rather than passively receiving it.

Bold and progressive policy choices are necessary to address both an environmental imperative and to reduce exposure to risks, as a quicker embrace of major technology transitions can support transformative investment decisions, reduce risks of job losses, and facilitate job creation.

The EU's ambitious policies vis-à-vis e-mobility strengthens the case for stronger policy interventions in the WeBa given the EU's status as the WeBa's main trade partner and mutual interests to move towards closer integration. Key challenges for the WeBa pertain to ensuring an equitable transition, as cleaner vehicles come with higher upfront costs. This is an issue that is especially clear for electric vehicles, as they are less frequently available in the secondhand market, the main avenue for vehicle stock buildup and replacement in the WeBa.

Differentiated tax schemes and fuel tax reforms can be designed to improve the environmental performance of fleets while increasing fiscal revenue in the short and medium terms. As the road transport sector transitions to e-mobility in the WeBa, leading to a longer term drop in fossil fuel consumption, it will be important to combine near-term reforms with alternative funding mechanisms (such as distance-based charges) to avoid risks of budgetary shortfalls.

Priority policy solutions

Policy solutions can allow the WeBa countries to make significant progress towards cleaner and more technologically advanced vehicle fleets, addressing not only environmental issues but also fiscal and equity aspects. A summary of these measures, prioritized according to the discussion developed in this policy note into seven different groups of policies, is included in Table 5.

³⁸ Similar developments are occurring on renewable electricity generation and digital technologies. These will be essential to handle electric vehicles and renewable energy integration, also in line with the indications of the Strategy for Sustainable and Smart Mobility in the Western Balkans of the Transport Community.

Table 5. Summary of the Policy Instruments Discussed in this Brief and Level of Prioritization.

Policy Actions	Priority	Policy Area Group
Introduce regulations on energy efficiency/CO ₂ emissions per km and stricter regulations on emissions of local pollutants for secondhand vehicle imports.	TOP	Regulatory requirements
Introduce fleet-level EV requirements and other measures for the early transition for highly utilized vehicles.	TOP	E-mobility
Implement differentiated vehicle taxation based on environmental performance where this is not already the case.	HIGH	Vehicle and fuel taxation
Increase fossil fuel taxation, alongside redistribution measures to respond to equity-related challenges.	HIGH	Vehicle and fuel taxation
Improve governance and enforcement of roadworthiness procedures and technical inspections.	HIGH	Regulatory requirements
Develop a clear policy framework for EV charging infrastructure.	HIGH	E-mobility
Introduce regulations on energy efficiency/CO ₂ emissions per km and stricter regulations on emissions of local pollutants for new vehicles.	MEDIUM ³⁹	Regulatory requirements

Note: These policy packages result from the screening and multi-criteria assessment of over 30 policy measures that could apply to the region.

Policy priorities include a combination of regulatory requirements, vehicle and fuel tax reforms, and policies that specifically support e-mobility. These instruments are crucial to influence investment decisions of key stakeholders, including the automotive industry sector (vehicle manufacturers, importers, component suppliers, dealers and maintenance), energy suppliers, electricity companies and vehicle users (including households and businesses, from small enterprises to major fleet owners).

Regulations recommended here target energy efficiency / CO₂ emissions per km and emissions of local pollutants. Like vehicle taxes differentiated based on environmental performances, these regulations are particularly important for the significant secondhand vehicle import flows that characterize the vehicles of the WeBa. Their stronger capacity to mobilize change, with respect to tax reforms, justifies the top priority level in Table 5.

Regulations on the environmental performance of vehicles need to be supported by measures enhancing roadworthiness and technical inspections: this is an area where there is significant scope for the EU and institutions such as the Transport and Energy Community to support the development of cost-effective reforms in the WeBa (for instance, by facilitating data exchange), but anyway requiring implementing actions in the region.

A focus on the early transition of highly utilized vehicles is crucial for the cost-effective deployment of e-mobility in the WeBa (e.g. buses, taxis, and urban delivery vehicles). These cost-effective applications are best placed to leverage policies to stimulate private capitals to bring electric vehicles to the region and start deploying charging infrastructure, reducing the need for governmental support. For this reason, the early transition for highly utilized vehicles is ranked as a “TOP” priority in table 5, while charging infrastructure is marked as “HIGH” priority. Improved governance, followed by adequate institutional, regulatory, and planning frameworks, are key enablers of both higher electric vehicle deployment and adequate charging infrastructure development.⁴⁰

³⁹ Due to a greater diffusion of secondhand vehicle purchases in less wealthy portions of the population, and taking into consideration equity challenges, coordinated action on regulatory requirements for both new vehicles and secondhand imports will be preferable.

⁴⁰ Investments for clean mobility options, including electric vehicles and charging infrastructure, are also more effective if costs of capital can be effectively brought down. This could be an opportunity space for multilateral development banks, including the World Bank, thanks to their access to capital with lower risk premiums, especially following recent calls for increased lending for solutions aligned with the Sustainable Development Goals (SDGs).

Taxation reforms are important both to send price signals and to ensure that revenues can be raised to support private investments in cleaner vehicles and related infrastructure. Table 5 lists both differentiated taxation based on environmental performance of vehicles and fuel excise duties/carbon pricing. The former is important to provide price signals to consumers. The latter could have greater scope to raise revenues, but they are subject to limitations in the WeBa, as the main road transport fuels are taxed at levels comparable with the EU, or actually higher when considering purchasing power.

Taxation reforms are especially relevant for regions already affected by significant public debt. Policies that require public support, and therefore a budgetary allocation, are best developed if paired with packages that also enable to raise revenues. The WeBa are not exempt from these considerations.

The combination of revenue generating policies and other measures supporting the transition towards e-mobility, from an industrial development and an equity / social perspective, are important to create the fiscal space needed to improve the strategic position of the region in the European automotive value chain and manage the social impact of the industrial transformation. This is also the approach adopted in the EU, where revenues from the reform of the Emission Trading Scheme are reallocated to support innovation and handle social unbalances, with redistributive interventions.

Funding the transition will require important fiscal engineering. Besides the fiscal opportunities that lie in some of these reforms, countries will need to approve budgets in the context of limited EU grant support (beyond charging infrastructure investment), and the lack of EU current instruments to leverage policy reform.

The way forward

Each WeBa country requires a tailored transition pathway and implementation agenda to work out the details and timing of road vehicle fleet decarbonization. Each policy reform shall consider country-specific market dynamics, equity and economic implications, and political economy aspects. Furthermore, a regional approach with joint coordination and alignment will help maximize environmental benefits and accelerate regulatory convergence with the EU and within the WeBa.

Countries in the WeBa need to accelerate the pace of implementation of the recommendations outlined in this report and seize environmental and fiscal opportunities. Key legislative initiatives need to be initiated in the countries, as each government is best placed to communicate the urgency for action to all relevant stakeholders. There are fiscal opportunities with some of these policies that need to be tapped into.

The strong interest in the EU integration can act as an important catalyser of action. Making sure that domestic legislation is developed to align with the *acquis communautaire* is a major opportunity, as it would also help the WeBa to access additional benefits available from EU integration, i.e., increased freedom of movement of people, capital, goods and services, the key pillars underpinning the EU single market.

International stakeholders are crucial to increase the level of ambition and accelerate the timeline for the green growth agenda. Key players include the Transport Community, the Energy Community and the EU. The Transport Community and the Energy Community play central roles in helping WeBa countries align their legislation with the European policy framework and the

acquis communautaire. The EU also plays a key role in fostering these efforts. These activities will need to move beyond the current scope of action, integrating measures that implement the EU Climate Law.

The EU can also develop policies to help WeBa countries manage the environmental impacts and enhance energy efficiency for road transport vehicles. These include improving the quality and completeness of the information contained in the EUCARIS database (or its update, via the MOVE-HUB electronic system), facilitating WeBa countries' access to the database, and rapidly finalizing the EU end-of-life vehicle Regulation. The EU may also consider conditionalities in grants associated with policy reform in this area. Other opportunities for industrial development, with positive implications for investments and job creation in the WeBa, can arise from the integration of strategic partnerships on sustainable raw materials and battery projects in the EU growth plan for the WeBa.

WeBa could also benefit from entities that support investments in sustainable transport, clean energy, climate action, digital technologies, and human capital development in the region. Partnerships supporting the green growth and air quality agendas can be pursued, including with international institutions such as the World Bank, EBRD, EIB, the United Nations Development Programme (UNDP) and bilateral donors, such as the government of Austria, the German Agency for International Cooperation (GIZ), SECO, KfW and the French Development Agency (AFD). The World Bank stands ready to support WeBa countries with knowledge and technical assistance (see box 3 for an example) towards designing and rolling out road vehicle decarbonization and e-mobility policies, conducting thorough fiscal analysis, and potentially coupled with policy and investment lending.

Box 3. Country-Specific Policy Roadmaps

The World Bank worked with the government of North Macedonia⁴¹ in 2023 to conduct a holistic assessment of opportunities to advance policy reforms to decarbonize road vehicles in the country. The assistance included a policy road action map (“deep dive”), which can serve as a blueprint model for the rest of the region. The deep dive prepared a detailed policy roadmap to support country-specific implementation (See Annex 1 for the example of North Macedonia Policy Roadmap). By modelling expected fiscal, environmental, and economic outcomes, and with close dialogue with national authorities and stakeholders, decisionmakers can make informed choices to decarbonize road transport following this roadmap. The policy roadmap proposes timeframe for implementing priority actions based on the current situation and the level of internal capacities.

In North Macedonia, the roadmap allowed policymakers to identify easily achievable opportunities with both positive environmental and fiscal implications, leading to the modification of a vehicle registration tax scheme in October 2023. This reform was part of the policy actions supported by the World Bank via the North Macedonia Sustainability and Resilience Development Policy Operation (DPO) approved in December 2023.⁴²

This kind of policy roadmap can be developed for other countries in the region building on the findings from this regional study.

⁴¹ Including Ministry of Finance, Ministry of Transport and Communications, Ministry of Environment and Physical Planning, Ministry of Interior, Ministry of Economy, and Customs Administration.

⁴² <https://projects.worldbank.org/en/projects-operations/project-detail/P180587>

Annex 1

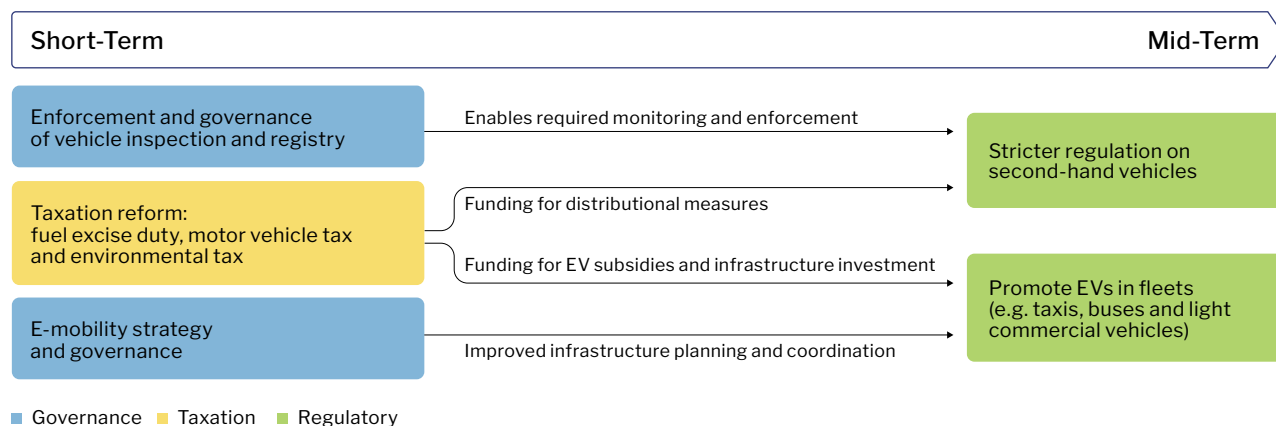
Summary of Road Vehicle Emission Management Roadmap in North Macedonia, Considering Environmental and Fiscal Implications

Building on the findings from the World Bank regional study “Policy Instruments for Managing Road Vehicle Emissions in the WeBa,” the World Bank worked with the government of North Macedonia to develop a policy road action map oriented towards implementation in the short and medium terms. This policy roadmap built on the following activities:

- **Engagement with government stakeholders** to assess current status, collect detailed data, identify policy gaps, and discuss potential policy reforms;
- **Benchmarking** of regulatory, governance, and taxation policies in North Macedonia with EU *Acquis Communautaire* and EU best practices;
- **Rating of policy measures** from regional study considering policy needs in the country;
- **Definition of policy scenarios** to be assessed, in consultation with government stakeholders;
- **Modelling of impacts** (environmental, economic, fiscal, social impacts) from policy scenarios;
- **Definition of specific actions** and timescales for policy implementation;
- **Tailored policy recommendations** in line with a green and inclusive growth agenda.

Figure A-1 illustrates the proposed policy roadmap, including policy packages and the links between them. Three different types of reform are considered: governance, taxation and regulatory. The policy roadmap covers two timeframes: Short-term policy reforms were considered for adoption within a timeframe of one to two years. These are meant to enable and facilitate the adoption of mid-term policy reforms to be adopted in two to three years. Improvements in the enforcement of vehicle inspection and registry are considered as enablers of effective application of further regulatory requirements on secondhand vehicles. Similarly, a clear governance and strategy on e-mobility should start before or parallel to the adoption of EV fleet requirements. Increases in revenue from fiscal reform can be allocated to fund specific measures aimed at mitigating negative impacts on vulnerable populations from the stricter regulation of secondhand vehicles. Additional fiscal revenue increases could be spent on promoting the roll-out of EVs and EV charging infrastructure through financial support for the purchase of EVs and investment in charging infrastructure.

Figure A-1. Policy Roadmap Diagram



The main **barriers** for policy action were found to be:

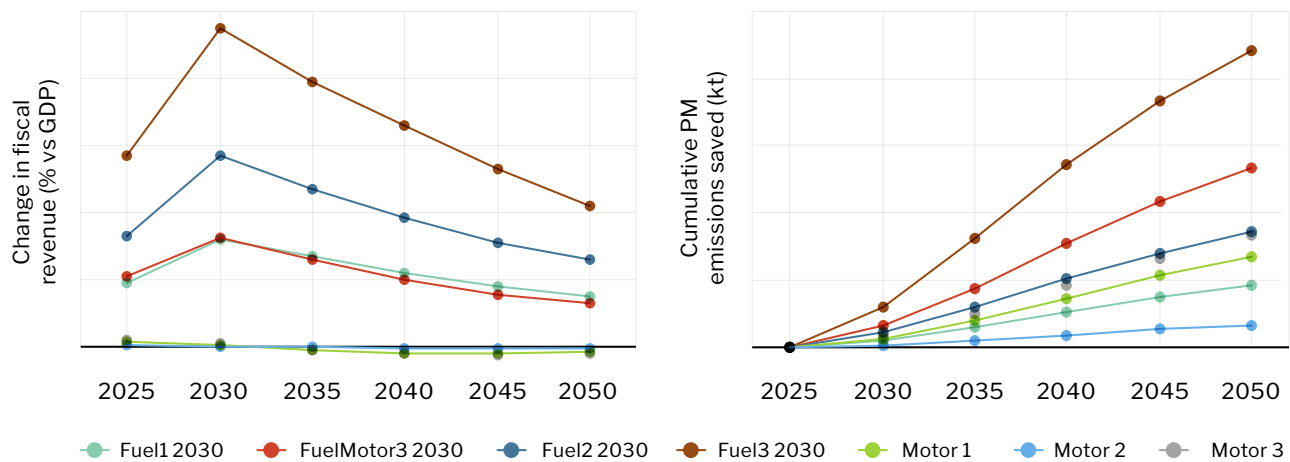
- **Affordability and equity:** Collected evidence suggests that households with higher income / consumption proportionally spend more on private transport than lower income segments, which may alleviate some of the equity concerns of policies increasing the cost of highly polluting vehicles. Nevertheless, effective distributional policies mitigating any negative impacts on vulnerable households and small enterprises may be required on an ad hoc basis.
- **Governance:** Policy action in the short term should aim to overcome current governance barriers related to insufficient coordination of key institutions and lack of clarity on the allocation of responsibilities and leadership roles. This is a key enabler for an effective and efficient implementation of policy reforms in this area.

The detailed evaluation of economic, environmental, fiscal and social impacts of policy measures included in the policy roadmap, supported by the application of a detailed modelling approach (see model output examples in figure A-2), led to the following **policy recommendations:**

- A **reform on road transport fuel excises** is recommended in the short term to align with the EU Energy Taxation Directive, generate additional fiscal revenue, and incentivize lower consumption of fossil fuels in road transport. This is recommended to be implemented gradually and alongside compensatory measures to mitigate equity implications.
- A **motor vehicle tax reform** involving an increase in the CO₂ coefficient rate and an expansion of the scope to light commercial vehicles would complement the fuel tax reform. This reform would bring additional emission reductions and fiscal revenues in the short term, although much more limited than those of the fuel tax.
- Setting **stricter emission standards for secondhand import vehicles** should be a priority measure (as an amendment to the current minimum Euro 4/IV standard in the Motor Vehicle Law) to reduce air pollution from road transport over the period 2025-2035.
- It is recommended to introduce policy instruments to promote the uptake **of EVs and roll-out of required charging infrastructure in vehicle fleets**, potentially including taxis, buses, and light commercial vehicles. This initiative may be implemented in the mid-term (the next two to three years).

- As a policy area for further research (not analyzed in detail herein), authorities in North Macedonia should consider adding a **minimum energy efficiency threshold or a regulatory cap on CO₂ emission per km for secondhand imports**.
- A **reform of the environmental tax** on vehicles (annual vehicle circulation tax) is not considered to be a priority, as benefits are likely to be very marginal.

Figure A-2. Example Outputs from the Model for a Subset of Assessed Scenarios: a) Annual Change in Fiscal Revenues (Left); and b) Cumulative Emission Savings of Particulate Matter (Right)



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Policies to Improve the Environmental Performance of Road Vehicles in the Western Balkans

Managing road vehicle emissions and
embracing e-mobility

May 2024