

Status of vehicle standards in Europe and North America – May 2024

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INTRODUCTION

This brief, produced for the 2024 Transatlantic Transportation Decarbonization Summit, updates the 2023 brief produced for last year's Summit. It summarizes the status of vehicle standards in Europe and North America as of May 2024.¹ Since the last summit in May 2023, six major policies have been finalized into new regulations.² In addition, more states in the United States have adopted California's Advanced Clean Cars II rule (seven additional states plus the District of Columbia) and Advanced Clean Trucks rule (three additional states). Policies summarized in *italics* were outlined in last year's brief and are provided here for context.

CALIFORNIA

LIGHT-DUTY VEHICLES

In August 2022, the California Air Resources Board (CARB) adopted Advanced Clean Cars II (ACC II) regulations that will apply to manufacturers of new passenger cars and light-duty and medium-duty trucks. The rule sets minimum electric vehicle sales share requirements that increase annually from 35% in 2026 to 68% in 2030 and 100% in 2035. ACC II caps plug-in hybrid electric vehicle

¹ The scope is limited to new vehicle standards for zero-emission or electric vehicles, carbon dioxide (CO₂)/greenhouse gases (GHGs)/fuel efficiency, and air pollutants for light-duty and heavy-duty vehicles at the state, national, or supra-national level from the governments of California, Canada, the European Union, the United Kingdom, and the United States.

² Federal light-duty electric vehicle sales regulation (Canada), HDV CO₂ standards (EU), Euro 7 standards (EU), light-duty ZEV sales regulation (UK), multi-pollutant standards for LDVs and MDVs (U.S.), and HDV Phase 3 GHG standards (U.S.).

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(PHEV) credits for compliance at 20% in any given model year. PHEVs are given partial or full credits depending on their all-electric range (AER); in model year 2026, all PHEVs must have at least a 40-mile AER on the US06 drive schedule (an aggressive test cycle that indicates that the vehicle can run on electricity under any normal driving conditions), have DC fast charging capability, and meet super ultra-low emission vehicle emission standards. To be eligible for full credits, PHEVs must have at least a 70-mile AER certification range. From 2029 onwards, all PHEVs must have at least a 70-mile AER over the US06 drive schedule.

In addition to California, 12 other states and the District of Columbia have adopted ACC II; this rule will apply to vehicles beginning in model year 2026 or 2027, depending on the state. The ICCT's prior modeling in the Baseline 2023 scenario considered the adoption of ACC II by Massachusetts, New York, Oregon, Vermont, and Washington. The new Baseline 2024 scenario also considers the recent adoption of ACC II by Colorado, Delaware, Maryland, New Jersey, New Mexico, Rhode Island, Virginia, and the District of Columbia; see below for details of the projected impacts. Note that Colorado, Delaware, and New Mexico have adopted ACC II only through model year 2032 and hence mandate that electric vehicle sales shares reach 82% by that year without requiring that shares continue to increase to 100% by 2035, which is the case in the other states that have adopted ACC II. These additional jurisdictions account for about 10% of total U.S. light-duty vehicle (LDV) sales, bringing the total market coverage of ACC II jurisdictions to around one-third of U.S. LDV sales.

HEAVY-DUTY VEHICLES

In August 2021, CARB finalized its [Advanced Clean Trucks regulation \(ACT\)](#), which applies to manufacturers of trucks with a gross vehicle weight rating (GVWR) over 8,500 pounds (~3.86 tonnes). The rule sets zero-emission vehicle (ZEV) sales share requirements that increase annually between model years 2024 and 2035. These include the requirement that in model year 2030 the minimum ZEV sales share of class 4-8 single unit vehicles is 50%. The minimum sales share of both class 2b-3 single unit vehicles and class 7-8 combination vehicles is 30%.

As of May 2024, 11 states have adopted ACT. In California, the rule takes effect in model year 2024. The rule takes effect in other U.S. states anywhere from model year 2025 to 2027, depending on the state. The Baseline 2023 scenario reflects ACT adoption by California, Maryland, Massachusetts, New Jersey, New York, Oregon, Vermont, and Washington. The Baseline 2024 scenario also considers the recent adoption of ACT by Colorado, New Mexico, and Rhode Island. These three states collectively account for about 3% of total U.S. medium- and heavy-duty truck sales, bringing the total market coverage of ACT to around one-quarter of U.S. medium- and heavy-duty truck sales.

Other recent policies adopted by CARB, and outlined in the [2023 policy brief](#), include the 2021 [Omnibus](#) regulation and the April 2023 [Advanced Clean](#)

Fleets regulation. Changes to the Omnibus regulation based on an agreement reached between CARB and the Truck and Engine Manufacturers Association (EMA) are being incorporated into the regulation; these are not reflected in the scenario modeling.

CANADA

LIGHT-DUTY VEHICLES

Canada's standards for cars and light trucks are aligned with U.S. Environmental Protection Agency (EPA)'s GHG standards through model year 2026 and Tier 3 emissions standards. In December 2023, the government adopted its Electric Vehicle Availability Standard, which includes regulated targets for ZEVs. These ZEV targets set increasing annual sales share requirements, including at least 20% by 2026, 60% by 2030, and 100% by 2035. Canada's regulation treats PHEVs similarly to California's ACC II rule; PHEVs are given partial or full credit as ZEVs based on their all-electric range, with the share of compliance credits that can be met with PHEVs capped at 45% in 2026, 30% in 2027, and 20% from 2028 onwards.

HEAVY-DUTY VEHICLES

Canada's standards are aligned with U.S. EPA's Phase II GHG standards through model year 2027 and EPA 2010 emissions standards. Additionally, Canada's 2030 emission reduction plan states that the government will develop a strategy to reach 35% ZEV sales for medium- and heavy-duty vehicles by 2030 and 100% by 2040. Canada's iMHZEV Program, launched in July 2022, offers incentives that vary according to vehicle class, of up to 200,000 Canadian dollars (CAD) for eligible vehicles. More than 635 million CAD in the 2023-24 fiscal year will go to incentives for light-, medium- and heavy-duty ZEVs. Canada is also a signatory to the Global Memorandum of Understanding on Zero-Emission Medium- and Heavy-Duty Vehicles (Global MOU on ZE-MHDVs) which requires at least 30% ZEV sales for such vehicles by 2030 and 100% by 2040. The province of British Columbia in May-June 2023 sought inputs on ZEV requirements for MHDVs, and released a consultation paper for technical stakeholders. However, no ZEV sales requirement policy has been proposed as of May 2024.

EUROPEAN UNION

LIGHT-DUTY VEHICLES

CO₂ emission standards

The European Council has adopted the Fit for 55 CO₂ standards, which require CO₂ emission reductions for new cars and vans of 50% (vans) and 55% (cars) by 2030 and 100% by 2035 compared with 2021 levels. Targets applying from

2021 onwards are based on the *Worldwide harmonized Light vehicles Test Procedure (WLTP)*.

Pollutant emission standards

In April 2024, the European Council adopted Euro 7 standards for cars, vans and trucks. The Euro 7 standards were published in early May 2024, and set separate type-approval requirements for LDVs (category M₁ and N₁) and HDVs (category M₂, M₃ and N₂, N₃). A summary of the Euro 7 updates for HDVs is given in the following section.

For LDVs, the main change from Euro 6 standards in tailpipe emissions limits is for particle number and particulate matter (PM) limits; all engines (including indirect inject engines) would be required to meet these limits, and the particle number limit would include particles as small as 10 nanometers (previously 23 nm). Evaporative emissions limits were tightened by 25% compared to Euro 6.

As with Euro 6, the standards go beyond setting type-approval emissions limits, by setting emissions-related durability requirements (over a defined vehicle lifetime, and verified by in-service conformity and market surveillance testing) and defining on- and off-board compliance verification methods. The standards further set type-approval requirements for brake systems (with tighter limits for electric vehicles, where regenerative braking results in less brake pad/disc abrasion) and tires.

Furthermore, Euro 7 sets durability requirements for batteries used in light-duty battery-electric and plug-in hybrid vehicles, extends on-board fuel and energy consumption monitoring (OBFCM) to all vehicle categories and powertrains, and requires all vehicles to be equipped with an environmental vehicle passport, which provides key environmental and energy performance data in digital format.

Euro 7 standards come into effect first for new type approvals from 29 November 2026 for LDVs, and 29 May 2028 for HDVs, and after a year's delay (i.e., from 29 November 2027 for LDVs, and 29 May 2029 for HDVs), for all new vehicles sold in the European Union.

HEAVY-DUTY VEHICLES

In May 2024, the European Council formally adopted CO₂ standards for HDVs. The previous standards required a 15% CO₂ reduction by 2025 a 30% reduction by 2030. The new standards expand the scope of vehicle classes covered and require a 45% HDV CO₂ reduction by 2030, a 65% reduction by 2035, and a 90% reduction by 2040.³ The standards directly set mandatory minimum ZEV

³ The new standards apply to trucks of >7.5 tonnes gross vehicle weight, coaches, and urban buses. These segments account for 90% of all new truck and bus sales, compared with 65% of new truck and bus sales covered by the previous standards.

sales requirements for urban buses of 90% ZEV sales by 2030 and 100% ZEV sales by 2035.

Moving forward from these standards, the Commission is tasked with assessing the need to facilitate adoption of ZEV retrofits. The Commission is also called to review the regulation in 2027, to evaluate the possibility of assessment and reporting of full life-cycle CO₂ emissions, to assess the role of a carbon correction factor, and to propose a methodology for registering HDVs running exclusively on CO₂-neutral fuels.

As outlined in the previous section, the recently adopted Euro 7 standards set more stringent limits in particular for HDVs. The adopted standards tighten the nitrogen oxides (NO_x) limits by 50%–62% (depending on test cycle) and replace total hydrocarbon (THC) limits with separate tightened limits for non-methane organic gases (NMOG) and methane (CH₄). The conformity factor for on-road verification of emissions was made more stringent, as it was lowered from 1.5 to 1.0. The power threshold for on-road testing was also lowered to 6%, thereby improving coverage of the standards at low-power (i.e., low speed and/or load) operating conditions.

CHARGING INFRASTRUCTURE

The EU's Alternative Fuels Infrastructure Regulation (AFIR) entered into force in September 2023 as part of the Fit for 55 package of the European Commission. For both LDVs and HDVs, the regulation sets targets for the minimum capacity (both at the charging pool and charge point level) and maximum distance (for LDVs) and percent coverage (for HDVs) between recharging and hydrogen refueling stations along both the core and comprehensive corridor road network (the Trans-European Transport or TEN-T network) of the EU to be met by Member States. Thresholds are higher for the TEN-T core network than for the comprehensive network, and are staged to require progressive build-out by year end 2025, 2027, 2030, and 2035.

UNITED KINGDOM

LIGHT-DUTY VEHICLES

In September 2023, the Department for Transport (DfT) finalized its ZEV regulation and CO₂ emissions regulation for new cars and vans. The adopted ZEV regulation, which went into effect on 3 January, 2024, sets annual ZEV sales share requirements from 2024, and requires that 80% of new cars and 70% of new vans sold by 2030 be ZEVs. DfT has proposed a second stage of the ZEV regulation which would require that 100% of new cars and vans are ZEVs by 2035 in line with the government's commitment, but this has not yet been formally adopted. Alongside the ZEV regulation, the United Kingdom implemented a CO₂ standard for non-ZEV cars and vans which will ensure that the average emissions of new non-ZEVs does not rise. The regulations

are supported by government support for charging infrastructure and ZEV incentives, including rebates for home charging infrastructure installations for apartments and plug-in van grants.

HEAVY-DUTY VEHICLES

In May 2022, DfT held a consultation on how to regulate the phase-out of non-ZEV heavy goods vehicle (HGV) sales. In its response to stakeholder comments, the government concluded that the phaseout of HGVs of less than 26 tonnes is feasible by 2035, and it confirmed its intent to phase out sales of non-ZEV HGVs over 26 tonnes by 2040. In March 2022, DfT held a consultation on proposals to end the sale of non-ZEV buses, coaches, and minibuses. The consultation proposed to end the sale of non-ZEV buses in the 2025 to 2032 time frame and called for evidence as to how soon non-ZEV coach and minibus sales could be phased out.

The DfT's call for evidence on infrastructure for zero emission heavy goods vehicles and coaches closed in October 2023. With battery electric technologies becoming the early dominant technology for lighter HGVs in urban and return-to-base operations, and battery electric and fuel cell HGV models being demoed and becoming commercially available, DfT aims to develop a zero emission HGV and coach infrastructure strategy in 2024, setting out the strategic direction and roles and responsibilities for government and industry to ensure the deployment of refueling and charging infrastructure needed to transition to 100% zero emission HGVs by 2040.

The United Kingdom is also a signatory to the Global MOU on ZE-MHDVs which targets at least 30% ZEV sales for such vehicles by 2030 and 100% by 2040.

UNITED STATES

LIGHT-DUTY VEHICLES

In March 2024, the U.S. EPA issued a final rule on multi-pollutant emissions standards. The rule sets new annual requirements to reduce both “criteria” pollutant emissions—including NO_x, PM, and NMOG—and GHG emissions from light-duty and medium-duty vehicles, which phase in over model years 2027 through 2032. It is expected to reduce new-vehicle GHG emissions by about 11% per year, up from 8% per year for the previous standards that cover model years 2023–2026. Projected benefits include net savings of nearly \$100 billion, including \$13 billion in reduced health costs attributable to tailpipe emissions and \$46 billion in fuel savings. For LDVs, EPA projects the standards would achieve a 68% EV sales share for new vehicles by model year 2032.

U.S. Tier 3 emission standards are still being phased in from 2017 to 2025. Tier 3 requirements apply to new vehicles weighing up to 14,000 pounds (6,350 kg) and apply over a full useful life of 150,000 miles (241,000 km) or 15 years.

The U.S. EPA finalized Tier 4 emission standards at the same time as the multi-pollutant emissions rule. Tier 4 standards also apply over the full useful vehicle life and will be fully phased-in from model years 2027 through 2033. For LDVs, NMOG+NO_x standards will phase down to a fleet-average level of 15 mg per mile by model year 2032, representing a 50% reduction from the Tier 3 limits. For medium-duty vehicles, the NMOG+NO_x limit is 75 mg per mile by model year 2033, a 58% and 70% reduction from Tier 3 limits for class 2b and class 3 vehicles, respectively. A PM standard that by 2030 (for LDVs) and 2031 (for medium-duty vehicles) phases down to 0.5 mg/mile will apply across three test cycles. The PM standards are projected to require the use of particulate filters on gasoline vehicles; EPA projects that this will reduce tailpipe PM from gasoline vehicles by over 95%. The Tier 4 standards also set stricter limits for carbon monoxide emissions.

HEAVY-DUTY VEHICLES

EPA finalized its [Phase 3 HDV GHG standards](#) in March 2024, setting stronger standards for model years 2027 through 2032. The standards vary by vehicle type and result in improvements over the previous Phase 2 standards by model year 2032 ranging from 25% for sleeper cabs to 60% for the lightest vocational truck class. While the standards are technology-neutral and performance-based, they are expected to lead to increased deployment of zero-emission, electric drive technologies and avoid the equivalent of 1 billion metric tons of CO₂ from 2027 through 2055.

PROJECTED CO₂ IMPACTS

The ICCT has conducted modeling for the [ZEV Transition Council](#) that projects well-to-wheel CO₂ emissions of LDVs and HDVs in each major vehicle market under several policy scenarios. The scenarios and results in this briefing reflect an update to the [modeling](#) published in September 2023:

- » **Baseline 2021** considers standards adopted as of August 2021, as reflected in the ICCT's initial 2022 assessment of the CO₂ and ZEV adoption implications of national policies across key markets.
- » **Baseline 2023** extends the timeline of adopted standards considered in the analysis through March 2023, and adds announced electric vehicle targets for emerging markets and developing economies.⁴ It includes projections of ZEV market growth in the United States under the Inflation Reduction Act, as well as state-level adoption of California's Advanced Clean Cars II and Advanced Clean Trucks rules. For the European Union, it includes adopted EU LDV CO₂ standards that allow the sale of only zero-CO₂ emission vehicles starting in 2035.

⁴ Further details on this scenario can be found in the [September 2023 report](#) by Sen and Miller.

- » **Baseline 2024** further extends the timeline of adopted standards considered in the analysis through May 2024. It captures six major recently adopted policies, with major implications for ZEV adoption and CO₂ emissions reductions across all four of the geographies considered here.
- » **Momentum** considers proposed standards and announced targets even if currently non-binding, including participation in global agreements such as the [Accelerating to Zero Coalition \(ZEV Declaration\)](#) and the [Global Memorandum of Understanding on Zero-Emission Medium- And Heavy-Duty Vehicles](#) (Global MOU on ZE-MHDVs).
- » **Ambitious** assumes all markets accelerate the transition to ZEVs for all vehicle types. For the six markets included in this briefing, it assumes ZEVs account for at least 82% of new car and van sales by 2030 and 100% by 2035; 82% of bus sales by 2030 and 100% by 2035; 44% of medium truck sales by 2030 and 73% by 2035; and 36% of heavy truck sales by 2030 and 59% by 2035.

The analysis finds that an accelerated global transition to ZEVs consistent with our Ambitious scenario is compatible with limiting warming to below 2°C. This briefing features updated modeling for the European Union, the United States, Canada, and the United Kingdom, factoring in policy developments through at least May 2024. California is modeled as part of the United States. The scenario definitions for these markets are consistent with our previous analyses.⁵

Figure 1 shows projected well-to-wheel CO₂ emissions from cars, vans, buses, and trucks (“vehicles”) in the European Union, United States, United Kingdom, and Canada. The lines show absolute CO₂ emissions projected for each updated policy scenario. The y-axes between the European Union and United States and the United Kingdom and Canada differ by an order of magnitude so that results are visible despite the different sizes of these markets.

The European Union’s Baseline 2024 pathway includes the CO₂ standards for cars and vans (LDVs), which allow only zero-carbon new vehicle sales from 2035, as well as heavy-duty CO₂ standards that would require at least a 90% emission reduction from 2019 for most new HDVs. As no new proposed policies are being considered at the European Union level, the Momentum scenario is the same as the Baseline 2024 scenario. The Ambitious pathway could be achieved by outperforming both the LDV standards (going to 100% zero-carbon new vehicle sales by 2030) and the HDV CO₂ standards (realizing only zero-carbon new vehicle sales by 2040).

For the United States, the Baseline 2024 scenario includes both the recently adopted multi-pollutant emissions standards for light-duty and medium-duty vehicles, and the Phase 3 GHG standards for HDVs. It also considers recent

⁵ To isolate the effects of changes in policy adoption, all scenarios have been re-run using the latest data for transportation activity and projections.

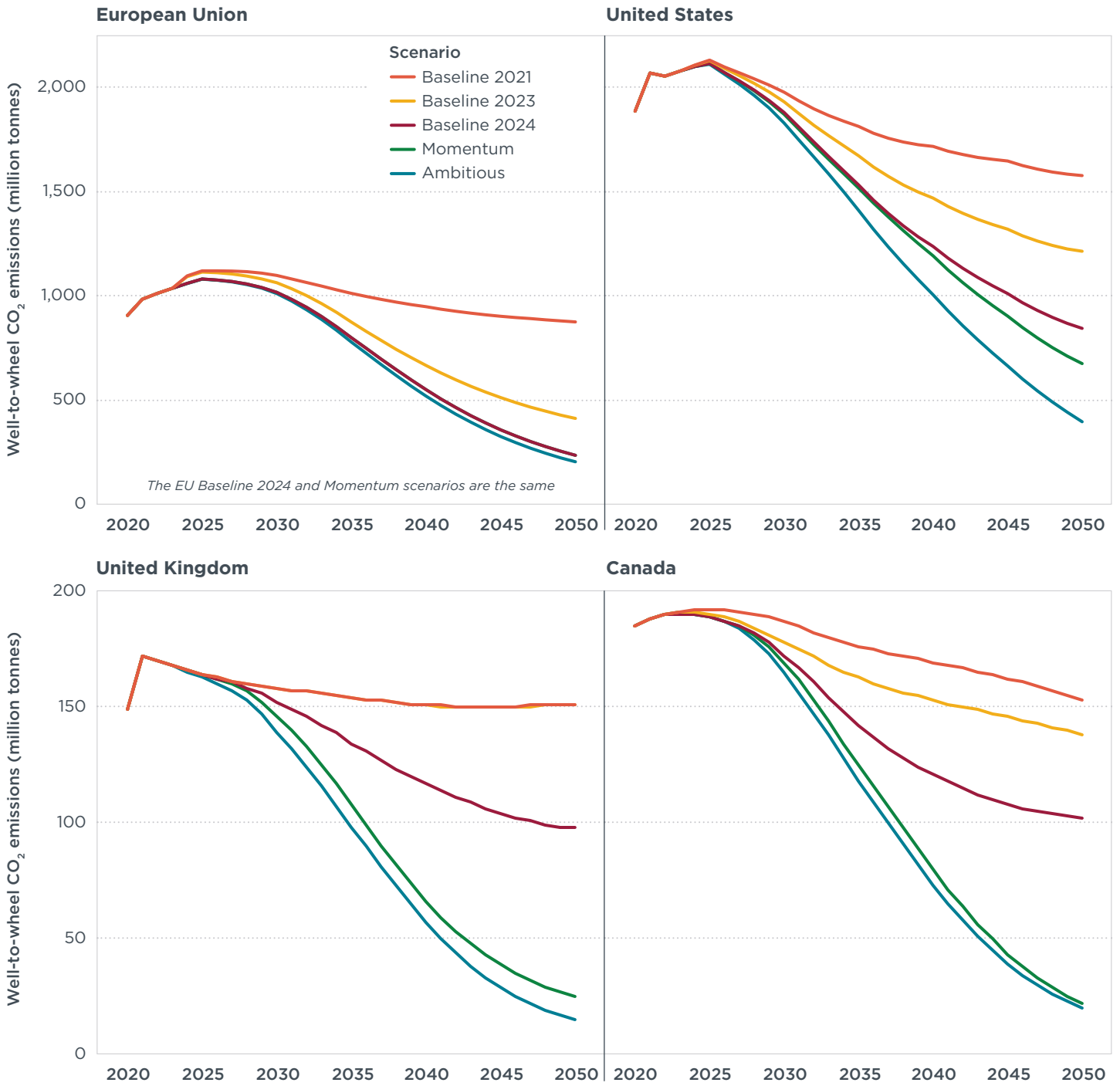
adoption of California's leading policies by additional states. It considers the ACC II rule that was adopted in August 2022, and since then has been adopted by many other states and the District of Columbia. This brings the share of the national LDV market following ACC II up to about one-third, up from about 20% as of March 2023.⁶ It also includes the California Advanced Clean Trucks rule that has been adopted by 11 states, which together account for about one-quarter of the U.S. truck market, up from about 22% as of March 2023, and the California Advanced Clean Fleets rule. The Momentum scenario includes the U.S. commitment to the Global MOU on ZE-MHDVs that targets 100% ZEV sales of new HDVs by 2040. The Ambitious pathway could be achieved by adopting standards that phase out combustion engine LDV sales by 2035 and achieve a faster phaseout for heavy-duty buses and trucks compared to the Global MOU on ZE-MHDVs.

Canada and the United Kingdom each have adopted or proposed policies that will phase out new non-ZEV sales of LDVs by 2035. Both countries are also signatories to the Global MOU on ZE-MHDVs and have similarly stringent national targets of their own for HDVs. If Canada and the United Kingdom follow through and adopt standards in line with their announced targets, they would be largely in line with ICCT's Ambitious ZEV scenario. The remaining mitigation potential could be achieved by increasing the stringency of targets in intermediate years.

⁶ Based on 2022 vehicle registrations as reported by the Federal Highway Administration.

Figure 1

Well-to-wheel CO₂ emissions from light- and heavy-duty vehicles from 2020 to 2050. These modeling results were generated using ICCT's Roadmap model.



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FOR MORE INFORMATION

The Zero Emission Vehicles Transition Council website, zevtc.org/ [tracking](#), tracks the progress of the global ZEV transition and analyzes recent developments in policies and regulations, ZEV sales, infrastructure development, and cost competitiveness for all members of the Council.

To share policy updates with our team, please email a.sen@theicct.org.

See also these related ICCT publications:

Press releases and policy updates

- » [California sets global precedent with first-ever 100 percent sales requirement for zero-emission trucks, paves the way with zero-emission fleet requirements](#)
- » [The EPA final multi-pollutant rule for light and medium-duty vehicles sends a resounding message about the accelerating transition to electric vehicles in the U.S.](#)
- » [Euro 7: The new emission standard for light- and heavy-duty vehicles in the European Union](#)
- » [Adoption of Phase 3 greenhouse gas rule for heavy-duty vehicles moves U.S. closer to climate goals](#)
- » [European Union Alternative Fuel Infrastructure Regulation \(AFIR\)](#)
- » [Advanced Clean Cars II: The next phase of California's zero-emission vehicle and low-emission vehicle regulations](#)
- » [The revised CO₂ standards for heavy-duty vehicles in the European Union](#)

Impact assessments

- » [Potential benefits of the U.S. Phase 3 greenhouse gas emissions regulation for heavy-duty vehicles](#)
- » [Assessment of light-duty electric vehicle costs in Canada in the 2023 to 2040 time frame](#)
- » [Benefits of adopting California's Advance Clean Cars II standards in sixteen U.S. States](#)
- » [Fit for 55: A review and evaluation of the European Commission proposal for amending the CO₂ targets for new cars and vans](#)
- » [The CO₂ standards required for trucks and buses for Europe to meet its climate targets](#)
- » [Emission reductions and public health benefits from timely Euro 7 standards](#)
- » [Analyzing the impact of the Inflation Reduction Act on electric vehicle uptake in the United States](#)
- » [Benefits of extending the EU heavy-duty CO₂ emissions standards to other truck segments](#)



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