

Update on government targets for phasing out new sales of internal combustion engine passenger cars

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The number of national and sub-national governments committing to phase out the sale or registration of new internal combustion engine (ICE) passenger vehicles continues to rise. Since early November 2020,¹ several jurisdictions have joined this group, and others are planning to strengthen existing commitments by moving target dates up.

This briefing surveys the latest developments and summarizes the current overall state of ICE phase-outs as a policy approach to decarbonizing transport. The focus is on passenger cars. We start with a note on the vehicle technologies involved and then examine the announcements since mid-November 2020. Following that, we provide a global overview of all phase-out targets to date, with details of each policy in a concluding table.

UNDERSTANDING ELECTRIC VEHICLE TECHNOLOGIES THAT COULD REPLACE CONVENTIONAL ICE VEHICLES

The phase-outs called for in different jurisdictions vary not only in their timing but also in their definition of what qualifies as a zero-emission, or non-ICE, vehicle. Clarity on the various technology mixes in view is important for understanding the potential climate implications of these policy initiatives.

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¹ We published a similar update then: Sandra Wappelhorst and Hongyang Cui, "Growing Momentum: Global Overview of Government Targets for Phasing out Sales of New Internal Combustion Engine Vehicles," *ICCT* (blog), November 11, 2020, <https://theicct.org/blog/staff/global-ice-phaseout-nov2020>

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In California, for example, Governor Gavin Newsom's executive order of September 2020 declared it to be "a goal of the State that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035," and also set targets for medium- and heavy-duty trucks (2040), drayage trucks (2035), and off-road vehicles and equipment (2035).² Two types of vehicles indisputably fall within California's targets: Battery electric vehicles (BEVs) and hydrogen fuel cell electric vehicles (FCEVs), which run exclusively on electricity and produce zero harmful tailpipe pollutant emissions. Recognizing them as zero-emission vehicles is thus straightforward, even while acknowledging that the life-cycle greenhouse gas (GHG) emissions of these vehicles may be, and for the moment are, non-zero.

Plug-in hybrid electric vehicles (PHEVs) present a somewhat different case. The California Air Resources Board is currently determining whether PHEVs will count toward the 2035 zero-emission vehicle sales target.³ The battery that powers the electric motor in a PHEV is recharged with electricity by plugging in, just like a BEV. But a PHEV also has an ICE and a tailpipe for the emissions from combustion. Classifying the vehicle, either in theory or in real-world practice, is thus not as straightforward. A recent ICCT study found that the fuel consumption and thus tailpipe carbon dioxide (CO₂) emissions of PHEVs in real-world usage is, on average, approximately two to four times higher than indicated by type-approval values.⁴ The share of PHEVs differs widely by market, though, and PHEVs are a small portion of sales in several of the largest vehicle markets by sales.

Hybrid electric vehicles (HEVs) present yet another case. At the end of December 2020, Japan announced plans to achieve 100% electric passenger car sales by the mid-2030s at the latest.⁵ Under the country's Green Growth Strategy, sales of HEVs would still be permitted. HEVs are powered by an ICE that runs on gasoline or diesel and contain one or more supplementary electric motors fed by energy stored in batteries. The batteries cannot be recharged from the electricity grid, which is different from PHEVs, and are instead charged by operating the vehicle. The extent to which HEVs draw on battery power varies significantly among models. In a "full" HEV, the electric powertrain is capable of moving the vehicle on its own; in "mild" hybrids that is not the case. There is no generally accepted definition of what constitutes "full" or "mild" hybrids.

The map below showing ICE phase-out targets represents the variation in definitions used in two primary ways. First, targets that would allow cars other than BEVs, FCEVs, and PHEVs are excluded. Second, the map differentiates between countries, states, and provinces that plan to only allow the sale or registration of new BEVs and FCEVs by a certain date and those that would also allow PHEV sales. This is a consideration of the tailpipe emissions of PHEVs when not driven fully on electricity. Also note that this paper largely focuses on announced targets and not their implementation; this is despite making certain connections to implementation where it adds clarity, such as in cases where it is important to the goal itself.

2 State of California, "Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change", September 23, 2020, <https://www.gov.ca.gov/2020/09/23/governor-newsom-announces-california-will-phase-out-gasoline-powered-cars-dramatically-reduce-demand-for-fossil-fuel-in-californias-fight-against-climate-change/>

3 California Air Resources Board, "Governor Newsom's Zero-Emission by 2035 Executive Order (N-79-20)," January 19, 2021, <https://ww2.arb.ca.gov/resources/fact-sheets/governor-newsoms-zero-emission-2035-executive-order-n-79-20>

4 Patrick Plötz et al., *Real-World Usage of Plug-in Hybrid Electric Vehicles: Fuel Consumption, Electric Driving, and CO₂ Emissions*, (ICCT: Washington, DC, 2020), <https://theicct.org/publications/phev-real-world-usage-sept2020>

5 Ministry of Economy, Trade and Industry, "2050年カーボンニュートラルに伴うグリーン成長戦略令和2年12月25日 [2050 Carbon Neutral Green Growth Strategy 25 December 2020]," December 25, 2020, <https://www.meti.go.jp/press/2020/12/20201225012/20201225012-2.pdf>

ANNOUNCEMENTS OF ICE PASSENGER CAR PHASE-OUT TARGETS SINCE NOVEMBER 2020

The following governments have set a target or have announced plans to strengthen a target to end the sale or registration of new ICE passenger cars since early November 2020:

- » In mid-November 2020, the prime minister of the United Kingdom (UK) announced new phase-out dates for ICE passenger cars and vans, moving from the initial 2040 target to specified goals for 2035 and 2030.⁶ The announcement came as part of the government's "The Ten Point Plan for a Green Industrial Revolution," which also sets out a path to net-zero carbon emissions by 2050.⁷ One point of the plan is an accelerated shift to zero-emission vehicles. The plan states, "we are taking decisive action to end the sale of new petrol and diesel cars and vans by 2030, with all vehicles being required to have a significant zero emissions capability (e.g. plug-in and full hybrids) from 2030 and be 100% zero emissions from 2035." Based on today's technologies, the proposed 2035 target would only allow the sale of new BEVs and FCEVs.
- » The Scottish government brought forward its ICE vehicle phase-out target from 2032 to 2030, as outlined in its updated Climate Change Plan from December 2020.⁸ According to the plan, the target is "phasing out the need for new petrol and diesel cars and vans by 2030." The plan does not specify if other combustion engine technologies beyond gasoline and diesel would be affected. Scotland is not displayed separately in the map below, however, as the government has no power to determine which vehicles can be sold. That authority rests with the UK government.
- » In mid-November 2020, the government of the Canadian province of Québec announced plans to end the sale of new light-duty ICE vehicles by 2035 as part of its "2030 Plan for a Green Economy." This is the framework policy for electrification and combatting climate change. The plan states that the government's intention is for electric vehicles and other zero-emission vehicles to constitute 100% of new motor vehicle sales in 2035, and that the sale of new gas-powered vehicles will be prohibited.⁹ The plan does not define the exact kinds of vehicle technologies that would be allowed or not allowed. Based on the provincial government's webpage, however, electric vehicles include battery electric vehicles, battery electric vehicles with a range extender, and PHEVs.¹⁰ We therefore assume that from 2035, only the sale of new BEVs, FCEVs, and PHEVs would be allowed in the province.
- » At the end of December 2020, the government of Japan launched the Green Growth Strategy to support the overarching target of making Japan carbon neutral by 2050, as proclaimed by the prime minister in October 2020. The strategy sets a

6 GOV.UK, "Government Takes Historic Step Towards Net-Zero With End of Sale of New Petrol and Diesel Cars by 2030," November 18, 2020, <https://www.gov.uk/government/news/government-takes-historic-step-towards-net-zero-with-end-of-sale-of-new-petrol-and-diesel-cars-by-2030>

7 HM Government, "The Ten Point Plan for a Green Industrial Revolution," (November 2020), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936567/10_POINT_PLAN_BOOKLET.pdf

8 Scottish Government, "Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018-2032 - Update," (2020), <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/>

9 Gouvernement du Québec, "Plan Pour une Économie Verte 2030 [Green Economy Plan 2030]," (2020), <https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/environnement/publications-adm/plan-economie-verte/plan-economie-verte-2030.pdf?1605549736>

10 Gouvernement du Québec, "Les Types de Véhicules [Types of vehicles]," (2012-2020), <https://vehiculeselectriques.gouv.qc.ca/decouvrir/types-vehicules.asp>

goal of 100% electric passenger car sales by the mid-2030s at the latest.¹¹ Electric vehicles, fuel cell electric vehicles, plug-in hybrid electric vehicles, and hybrid vehicles would count toward the 100% new electric passenger car sales target. As the sale of new HEVs would still be explicitly allowed, we do not consider Japan's announcement as an ICE phase-out commitment.

- » Also in late December 2020, the U.S. state of Massachusetts announced its intention to phase out sales of new light-duty ICE vehicles by 2035.¹² The “Massachusetts 2050 Decarbonization Roadmap,” a report commissioned by the Massachusetts Executive Office of Energy and Environmental Affairs and published in December 2020, refers to California, which “is exploring regulatory options ... that will require 100% zero emission LDV sales by 2035.” The report indicates that when the regulatory framework for the planned ICE phase-out is finalized in California, “those requirements would also apply to vehicles in Massachusetts.”¹³ In addition, a request for residents' and businesses' comment on the state's interim “Clean Energy and Climate Plan for 2030” was issued in December 2020.¹⁴ The interim plan also refers to California's activities and suggests the same pathway as soon as California has adopted the relevant binding regulations about sales targets for manufacturers. However, Massachusetts is in the early stages of discussions and there has not yet been a clear commitment by the state, either in the form of the phase-out target being captured in an official policy plan or strategy or, as in the case of California, an executive order signed by the governor. Therefore, the announcement is not rated as an ICE phase-out commitment as it stands now.
- » In February 2021, Singapore announced new targets for its Singapore Green Plan 2030, which is aimed at tackling climate change. For transport, it was added to the plan that from 2030, all new cars registered have to be cleaner-energy models. A definition of “cleaner-energy models” is missing from the plan.¹⁵ In remarks on the plan, Singapore's minister for transport stated that cleaner-energy models “can be electric, hybrid, hydrogen fuel cell cars, etc.” Hybrid vehicles are not defined and HEVs are not explicitly excluded, but we assume that Singapore is aiming for new BEV, FCEV, and PHEV registrations only. The transport minister noted that the definition of registrable models would be finalized “well before 2030.”¹⁶
- » In mid-March 2021, Hong Kong announced it will stop the registration of new private ICE cars, including hybrids, by 2035. This was outlined in the city's Electric Vehicle Popularization Roadmap.¹⁷ Yet, the target is focused on private cars and not the entire passenger car market. Hence, we do not consider this to be target for a 100% ICE phase-out of all passenger cars.
- » In mid-April 2021, the U.S. state of Washington passed an amendment to a bill stating that “all publicly owned and privately owned passenger and light duty vehicles of model year 2030 or later that are sold, purchased, or registered in

11 Ministry of Economy, Trade and Industry, “2050 年カーボンニュートラルに伴うグリーン成長戦略令和2年12月25日 [2050 Carbon Neutral Growth Strategy 25 December 2020],” (December 25, 2020), <https://www.meti.go.jp/press/2020/12/20201225012/20201225012-2.pdf>

12 The Commonwealth of Massachusetts, “Request for Comment on Clean Energy and Climate Plan for 2030,” (December 30, 2020), <https://www.mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download>

13 Executive Office of Energy and Environmental Affairs and The Cadmus Group, “Massachusetts 2050 Decarbonization Roadmap,” (December 2020), <https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download>

14 The Commonwealth of Massachusetts, “Request for Comment”

15 Singapore Green Plan 2030, “Energy Reset,” accessed May 14, 2021, <https://www.greenplan.gov.sg/key-focus-areas/energy-reset/>

16 Ministry of Transport, “Speech by Minister for Transport, Mr Ong Ye Kung, at the Committee of Supply Debate 2021 on Singapore Green Plan 2030,” (March 4, 2021), <https://www.mot.gov.sg/News-Centre/news/detail/speech-by-minister-for-transport-mr-ong-ye-kung-at-the-committee-of-supply-debate-2021-on-singapore-green-plan-2030>

17 Financial Secretary, “電動車普及化 路線圖 [Popularization of the Electric Vehicles Roadmap],” (March 17, 2021), https://www.enb.gov.hk/sites/default/files/pdf/EV_roadmap_chi.pdf

Washington state” shall be electric vehicles.¹⁸ To become law, the legislation must be signed by the governor. In mid-May, this amendment to the bill was vetoed by the governor¹⁹ and therefore we do not consider the announcement an ICE phase-out commitment by the state yet.

- » At the end of April, the U.S. state of New York proclaimed that from 2035, only new zero-emission cars and light-duty vehicles shall be allowed to be sold. The relevant bill that provides that 100% of in-state sales of new passenger cars and trucks shall be zero-emission by 2035 has been passed by the state’s senate and assembly.²⁰ Here, too, the legislation needs to be signed by the governor to become law. A signature by the governor is still pending, and the target has also not been stated in an official plan or strategy. Therefore, the announcement in the State of New York is also not rated as an official ICE phase-out target for passenger cars as of today.

GLOBAL OVERVIEW OF ICE PASSENGER CAR PHASE-OUT TARGETS UNTIL 2050

The political map in Figure 1 highlights countries, provinces, and states whose governments have stated an intention to only allow the sale or registration of new BEVs, FCEVs, and PHEVs by some future date. Announcements that signal an intent to phase out the sale or registration of new gasoline and diesel cars but would explicitly permit the sale or registration of other new vehicles using fossil fuels, such as mild hybrid electric vehicles and HEVs, as well as compressed natural gas (CNG) and liquefied petroleum gas (LPG) vehicles, are not shown. Additionally, governments that limit the ICE phase-out target to certain user groups, for example private passenger cars, are not highlighted.

To qualify for inclusion in the map, the national target must have been stated as part of an official policy document such as a national climate or transport strategy/plan, in a law, or in a similar framework. Such frameworks include the investigation of a target by Sweden, which is outlined in more detail below. The special situation in the European Union is that member states cannot implement any individual ban of ICE vehicles because doing so would violate EU regulation. Therefore, countries such as Sweden have been investigating the legal strategies for an ICE phase-out before establishing the target as part of an official government document. In contrast, cases of a mere statement by a political representative and no further action are not counted as a commitment.

We acknowledge that the targets in these official policy documents have different qualities and come with different implications for implementation. Additionally, legal systems vary according to location. Because a country-level ban in the European Union is deemed to fall within the scope of, and therefore in conflict with, rules including the EU type-approval regulation²¹ and the CO₂ regulation for new passenger cars and

18 Committee on Transportation, “E2SHB 1287 – S COMM AMD,” April 10, 2021, <http://lawfilesexternal.leg.wa.gov/biennium/2021-22/Pdf/Amendments/Senate/1287-S2.E%20AMS%20ENGR%20S2584.E.pdf>

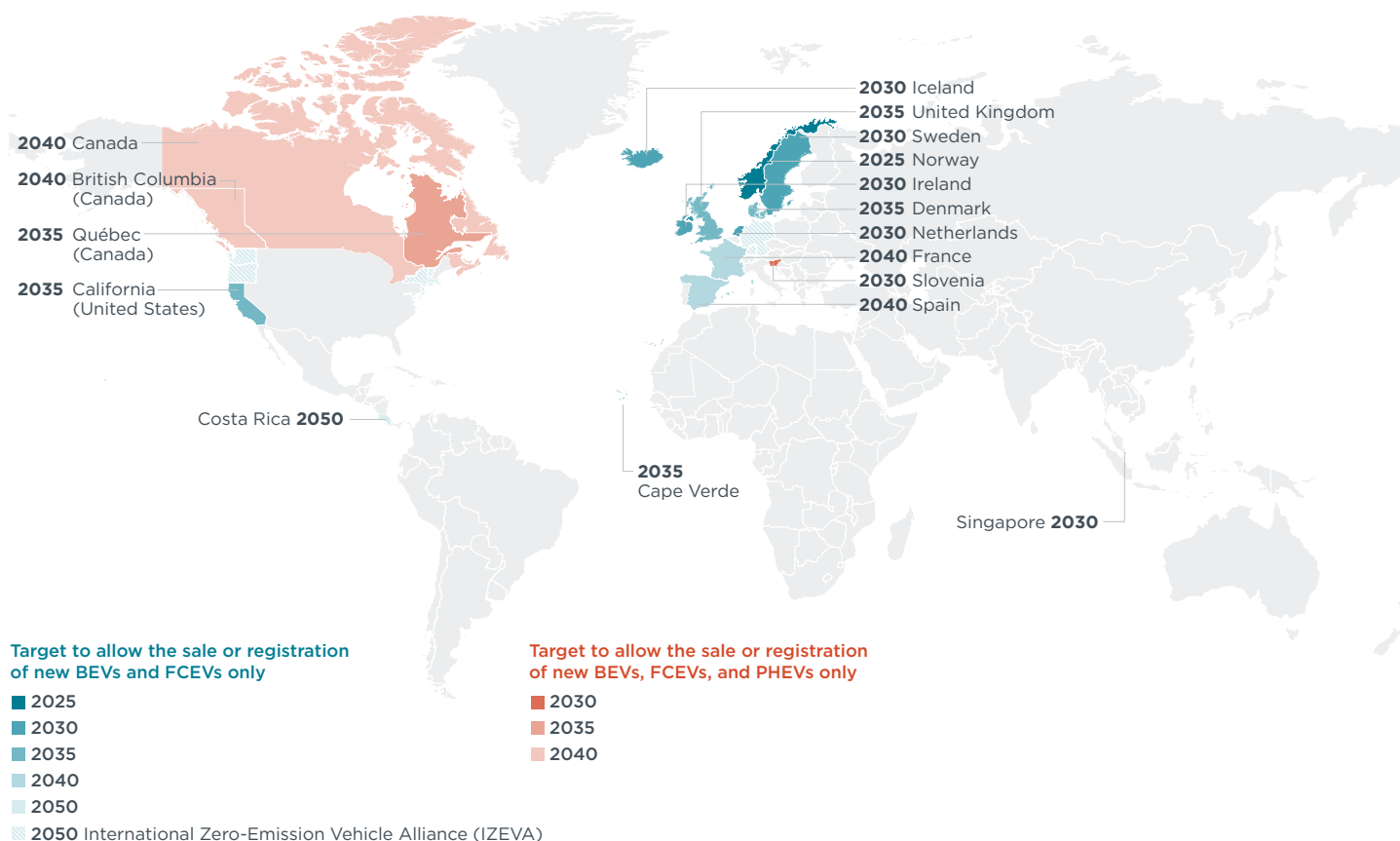
19 Hal Bernton, “Inslee Vetoes 2030 Target for Electric Vehicles Set by Washington Legislature,” *The Seattle Times*, May 15, 2021, <https://www.seattletimes.com/seattle-news/politics/inslee-vetoes-2030-target-for-electric-cars-set-by-washington-legislature/>

20 New York State Senate, “Senate Bill S2758,” January 25, 2021, <https://www.nysenate.gov/legislation/bills/2021/s2758>

21 Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC, Official Journal of the European Union, May 30, 2018), <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32018R0858&from=EN>

vans,²² one option could be the adoption of an EU-wide phase-out target. Alternatively, the EU could craft regulation allowing member states to ban new sales or registrations of ICE cars. But regulatory systems differ. In the United States (to mention only one contrasting example), states can have greater scope to regulate vehicles, though the precise interaction between state government and federal government authority in this area of commerce has not yet been fully tested. In any case, a target can be set despite these variations, with the difference being the implications the target has on future legal execution.

Governments with official targets to 100% phase out sales or registrations of new internal combustion engine cars by a certain date*
(Status: June 2021)



* Includes countries, states, and provinces that have set targets to only allow the sale or registration of new battery electric vehicles (BEVs), fuel cell electric vehicles (FCEVs), and plug-in hybrid electric vehicles (PHEVs). Countries such as Japan with pledges that include hybrid electric vehicles (HEVs) and mild hybrid electric vehicles (MHEVs) are excluded as these vehicles are non plug-in hybrids.

Figure 1. Government targets to 100% phase out the sale or registration of new ICE cars.

*This map is presented without prejudice as to the status of or sovereignty over any territory, the delimitation of international frontiers and boundaries, and the name of any territory, city, or area.

As shown in the map, nine countries in Europe have set targets for new zero-emission passenger car sales or registrations that would allow new BEV and FCEV sales only (marked in shades of blue). This also includes countries which have set targets to prohibit the new sale or registration of “fossil fuel vehicles” such as Iceland, Ireland, and France without specifying vehicle technologies affected. We assume that only BEVs and FCEVs would count toward non-fossil fuel vehicle phase-out targets. Norway has set the most ambitious target year, 2025, and will only allow new BEVs and FCEVs. Iceland, Ireland, Sweden, and the Netherlands would follow suit in 2030, according to current plans or proposals; they are followed by Denmark and the United

22 Regulation (EU) 2019/613 of the European Parliament and of the Council of 17 April 2019 setting CO₂ emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011,” Official Journal of the European Union, April 25, 2019, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0631&from=EN>

Kingdom in 2035, and France and Spain in 2040. The only country in Africa is the island state of Cape Verde, which is targeting to prohibit the import of ICE vehicles that use fossil fuel from 2035 to only allow the acquisition of electric vehicles. The only country in South America to set a target that excludes all new ICE car sales, Costa Rica, is almost 30 years in the future.

For Canada and its provinces, as outlined above, the definition of zero-emission vehicles implies that new PHEVs would be allowed for sale from 2035 (Québec) or 2040 (British Columbia) onward. Slovenia's CO₂ threshold of 50 g/km for new passenger car and van registrations by 2030 would, under today's technologies, include BEVs, FCEVs, and PHEVs.

Also shown on the map are the countries, states, and provinces of the International Zero Emission Vehicle Alliance (IZEVA) which have agreed to make all new passenger vehicle sales zero-emission by 2050 the latest.²³ Some of them, including British Columbia, California, Canada, the Netherlands, Norway, the United Kingdom, and Quebec (Canada), have officially committed to earlier 100% ICE passenger car phase-out targets as part of official policy documents. For others, shown in blue and white stripes, this target is not reflected in official national policy documents yet. One example of this is Germany.

Some more details regarding a few countries on the map:

- » Sweden's prime minister declared in a government statement in early 2019 that no new cars with a gasoline or diesel engine shall be sold in the country after 2030. Subsequently, in late 2019, the Swedish government commissioned a study investigating, in addition to an EU-wide phase-out, the potential of banning the sale of new gasoline and diesel cars at the national level. Commissioning such a study was also included in the Climate Policy Action Plan from 2019.²⁴ On June 1, 2021, the Swedish government published the outcome of this study, which was chaired by the director of sustainability and environment at the Swedish Transport Administration.²⁵ The study is called, "In a World That is Changing – Sweden Without Fossil Fuels 2040," and proposes that the Swedish government adopt a parliamentary goal stating that all new passenger cars from 2030 be zero-emission vehicles, in other words, cars without CO₂ emissions when driving (BEVs and FCEVs with today's technologies). Despite the target not being reflected in an official policy document yet, investigating the possibilities and legal requirements for implementing an EU-wide or national ICE phase-out target illustrates the commitment by the Swedish government to adopt such a goal. Sweden is therefore included in the map.
- » Note, too, that in the context of an EU-wide phase-out, there have been calls by some EU member states for the European Commission to set a phase-out date for the sale of new ICE cars. The most recent was in mid-March 2021, when Austria, Belgium, Denmark, Greece, Malta, Ireland, Lithuania, Luxembourg, and the Netherlands made this request.²⁶
- » Iceland's government limits its 2030 phase-out target to the extent that it makes it partially dependent on the technological development of electric or clean energy

23 ZEV Alliance, "International ZEV Alliance Announcement," December 3, 2015, <http://www.zevalliance.org/international-zev-alliance-announcement/>

24 Regeringskansliet, "Klimatpolitiska handlingsplanen [Climate Policy Action Plan]," (2019), (<https://www.regeringen.se/4af76e/contentassets/fe520eab3a954eb39084aced9490b14c/klimatpolitiska-handlingsplanen-fakta-pm.pdf>)

25 Government Offices of Sweden, "Inquiry Appointed on Phasing Out Fossil Fuels and Banning Sales of New Petrol and Diesel Cars," December 20, 2019, <https://www.government.se/press-releases/2019/12/inquiry-appointed-on-phasing-out-fossil-fuels-and-banning-sales-of-new-petrol-and-diesel-cars/>

26 Chris Randall, "Nine European Nations Call for EU Combustion Phase-Out," Electrive.com, March 11, 2021, <https://www.electrive.com/2021/03/11/nine-european-nations-call-for-eu-combustion-phase-out/#:~:text=In%20a%20letter%2C%20the%20Netherlands,of%20climate%20neutrality%20by%202050>

vehicles. The country also considers exemptions, for example for people living in remote areas where it might be difficult to use vehicles other than those that run on gasoline or diesel beyond 2030. Despite this potential limitation, we consider Iceland as aiming for new BEV and FCEV registrations only in 2030.²⁷

- » The Spanish government adopted its Law on Climate Change and Energy Transition in late May 2021, after more than two years of discussions. The law states that new passenger cars and light commercial vehicles shall gradually reduce their emissions such that no later than 2040 they become vehicles with emissions of 0 g CO₂/km.²⁸
- » The Canadian province of British Columbia is listed separately from the rest of Canada, despite having the same phase-out target, because it has also made its target into binding regulation. Note that British Columbia is the only government in the world to have done so thus far. In July 2020, the province adopted new regulation following the Zero-Emission Vehicles (ZEV) Act and it sets phased-in annual targets and other compliance requirements for automakers to gradually increase the sales share of new zero-emission passenger cars and light commercial vans to 10% by 2025, 30% by 2030, and 100% by 2040.²⁹

Other governments have set official targets that are not displayed in the map. An example is the Chinese province of Hainan, which would limit new sales to BEVs, FCEVs, and PHEVs only for certain user groups such as private cars; new CNG and LPG car sales would be allowed for things like conventional taxis, ride-hailing vehicles, and rental cars.³⁰ Israel is also not shown, as its 2030 ICE vehicle phase-out target refers to new private passenger car sales only.³¹

A few other countries are not listed because they have set targets for electric passenger car sales, but not yet at the 100% ambition level. Pakistan, for example, is aiming for 30% of passenger vehicle sales to be electric by 2030 and 90% by 2040.³² Mexico's goal is to capture 3% electric vehicle sales by 2022³³ and Colombia wants 10% of all vehicle sales to be zero-emission by 2025. The Central American country of Panama targets to have 25% to 40% of private vehicle sales be electric by 2030.³⁴

OUTLOOK

Overall, the national and sub-national governments that have committed to targets for phasing out new sales or registrations of ICE cars have sent a clear signal, even if it is not currently possible for the targets to be implemented in the form of binding regulation, as in the European Union. These targets can still push other governments

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- 27 Government of Iceland, "Aðgerðaáætlun í loftslagsmálum [Climate Change Action Plan", (2020), <https://www.stjornarradid.is/library/02-Rit--skyrslur-og-skrar/Adgerdaaetlun%20i%20loftslagsmalum%20onnur%20utgafa.pdf>
 - 28 Boletín Oficial del Estado, "Ley 7/2021, de 20 de mayo, de cambio climático y transición energética [Law 7/2021, of May 20, on climate change and energy transition]," May 21, 2021, <https://www.boe.es/boe/dias/2021/05/21/pdfs/BOE-A-2021-8447.pdf>
 - 29 British Columbia, "Province Puts in Place Rules for 100% Electric-Vehicle Sales by 2040," July 30, 2020, https://archive.news.gov.bc.ca/releases/news_releases_2017-2021/2020EMPR0031-001416.htm
 - 30 Hongyang Cui and Hui He, "Hainan's Clean Energy Vehicle Development Plan (2019-2030)," (ICCT: Washington, DC, 2019), <https://theicct.org/publications/hainan-clean-energy-vehicle-plan>
 - 31 State of Israel, Ministry of Energy, "Energy Economy Objectives for the Year 2030 - Executive Summary," (October 2018), https://www.gov.il/BlobFolder/reports/plan_2030_new/en/energy_economy_objectives_2030.pdf
 - 32 Moaz Uddin, "Pakistan's National Electric Vehicle Policy: Charging Towards the Future," *ICCT* (blog), January 10, 2020, <https://theicct.org/blog/staff/pakistan%E2%80%99s-national-electric-vehicle-policy-charging-towards-future>
 - 33 International Copper Association Mexico, "Alianza por la electromovilidad en México. Plan Estratégico 2019-2022 [Alliance for electromobility in Mexico. Strategic Plan 2019-2022]," (2019), https://www.conuee.gob.mx/transparencia/boletines/transporte/automovilistaeficiente/otrosdocumentos/Plan_estrategico_version_final_comprimido_Procobre.pdf
 - 34 República de Panamá, "Estrategia Nacional de Movilidad Eléctrica de Panamá [National Electric Mobility Strategy of Panama]," October 2019, https://www.gacetaoficial.gob.pa/pdfTemp/28892_A/75497.pdf

to aim in the same direction. As more governments announce their intention to end the sale of new ICE cars, this also increasingly puts pressure on car manufacturers. More and more of them have announced recently that they intend to switch production to electric vehicles.³⁵

Most of the governments discussed in this paper are located in North America and Europe. Timelines range from 2025 to 2050, but most are in the 2030 to 2035 timeframe. With today's technologies, the majority of countries with announced targets are aiming for new BEV and FCEV sales or registrations only, even though some remain vague. Note, too, that zero-emission vehicles might include different technologies in the future.

Still, in cases where phase-out language remains vague and does not specify if PHEVs would be included in the goal, the differentiation is important. This is particularly true in Europe, where PHEV registrations increased by three and a half times between 2019 and 2020. The fuel consumption and thus tailpipe CO₂ emissions of PHEVs in real-world usage could delay national ambitions to reduce GHG emissions from transport. This is also important to consider when transferring the announced ICE phase-out targets into policy actions or binding regulation.

Looking at the five largest passenger car markets by sales – in descending order China, the United States, Japan, Germany, and India – we find there is not yet any commitment toward 100% new zero-emission passenger car registrations or sales. The only country with a similar target is Japan, but it would still allow the sale of new HEVs after 2035. As countries seek to reduce the impacts of emissions from transport on climate change and to comply with the GHG reduction goals under the Paris Agreement, these targets for phasing out new ICE car sales or registrations will be increasingly relevant. A transition to zero-emission vehicles is necessary to reach these goals.

³⁵ Emil Nefzger, "GM-Ausstiegsplan bis 2035. So planen VW, BMW, Daimler und Co. den Abschied vom Verbrennungsmotor [GM Exit plan by 2035. VW, BMW, Daimler and Co. are planning to say goodbye to the internal combustion engine]," *Der Spiegel*, February 10, 2021, <https://www.spiegel.de/auto/vw-bmw-mercedes-und-co-wie-sich-die-autohersteller-vom-verbrennungsmotor-verabschieden-a-5af42a43-26b3-418e-8d83-421f223dec50>

ANNEX

Table 1. National, provincial, and state government targets for 100% phasing out the sale or registration of new ICE passenger cars and vans up to 2050 (status: June 2021).

Government	ICE phase-out year	Vehicle segments	Policy document (publication date) and quoted target
EUROPE			
Norway	2025	Passenger cars, light commercial vehicles	National Transport Plan 2018-2029 (2017) ^a <i>All new passenger cars and light vans sold in 2025 shall be zero-emission vehicles.</i>
Netherlands	2030	Passenger cars	Mission Zero (2019) ^b <i>In the coalition agreement, the Dutch government committed to the target of all new passenger vehicles sold in 2030 being zero-emission, whether hydrogen-electric or battery electric.</i>
Denmark	2035	Passenger cars	Climate and Air Plan (2018) ^c <i>In the area of transport, we set a goal of stopping the sale of new petrol and diesel cars from 2030. At the same time, the government's goal is that from 2035, plug-in hybrid cars will no longer be sold.</i>
Iceland	2030	Passenger cars	Iceland's 2020 Climate Action Plan (2020) ^d <i>In principle, it will not be permitted to register gasoline and diesel cars in Iceland 2030. With this, a clear line is drawn in the sand that cars only powered by fossil fuels will not be part of the future passenger car transport in this country.</i>
Ireland	2030	Passenger cars	Climate Action Plan (2019) ^e <i>Introduce legislation to ban the sale of new fossil fuel cars from 2030.</i>
Slovenia	2030	Passenger cars, light commercial vehicles	Market Development Strategy for the Establishment of Adequate Alternative Fuel Infrastructure in the Transport Sector in the Republic of Slovenia (2017) ^f <i>After 2025, Slovenia will limit the first registration of passenger cars and light commercial vehicles ..., which according to the manufacturer's declaration have a higher share of CO₂ than 100 g/km, and after 2030 reduce this limit to 50 g/km.</i>
Sweden	2030	Passenger cars	Climate Policy Action Plan (2019) ^g <i>An inquiry is appointed so that from 2030 it will no longer be allowed to sell new gasoline and diesel cars.</i>
United Kingdom	2035	Passenger cars, light commercial vehicles	Consulting on ending the sale of new petrol, diesel and hybrid cars and vans (2020) ^h <i>Step 1 will see the phase-out date for the sale of new petrol and diesel cars and vans brought forward to 2030. Step 2 will see all new cars and vans be fully zero emission at the tailpipe from 2035. Between 2030 and 2035, new cars and vans can be sold if they have the capability to drive a significant distance with zero emissions (for example, plug-in hybrids or full hybrids), and this will be defined through consultation.</i>
France	2040	Passenger cars, light commercial vehicles	Mobility Guidance Law (2019) ⁱ <i>The end of the sale of new passenger cars and light commercial vehicles using fossil fuels by 2040.</i>

a Norwegian Ministry of Transport and Communications, "National Transport Plan 2018–2029," (2017), (<https://www.regjeringen.no/contentassets/7c52fd2938ca42209e4286fe86bb28bd/en-gb/pdfs/stm201620170033000engpdfs.pdf>)

b Netherlands Enterprise Agency, "Mission Zero Powered by Holland," (2019), (<https://www.rvo.nl/sites/default/files/2019/06/Mission%20Zero%20Powered%20by%20Holland.pdf>)

c Energi-, Forsynings- og Klimaministeriet, "Sammen om en grønnere fremtid Klima- og luftudspil [Together for a greener future Climate and Air Plan]," (2018), (https://kefm.dk/media/6728/klimaministeriet_klimaogluftudspil_digital.pdf)

d Government of Iceland, "Aðgerðaáætlun í loftslagsmálum [Climate Change Action Plan]," (2020), (<https://www.stjornarradid.is/library/02-Rit--skyrslur-og-skrar/Adgerdaaetlun%20i%20loftslagsmalum%20onnur%20utgafa.pdf>)

e Government of Ireland, "Climate Action Plan 2019 To Tackle Climate Breakdown," (2019), (<https://assets.gov.ie/25419/c97cdecddf8c49ab976e773d4e11e515.pdf>)

f Republika Slovenija, "Strategija na področju razvoja trga za vzpostavitev ustrezne infrastrukture v zvezi z alternativnimi gorivi v prometnem sektorju v Republiki Sloveniji [Market Development Strategy for the Establishment of Adequate Alternative Fuel Infrastructure in the Transport Sector in the Republic of Slovenia]," (2017), (<https://e-uprava.gov.si/download/edemokracija/datotekaVsebina/298735?disposition=inline>)

g Regeringskansliet, "Klimatpolitiska handlingsplanen [Climate Policy Action Plan]," (2019), (<https://www.regeringen.se/4af76e/contentassets/fe520eab3a954eb39084aced9490b14c/klimatpolitiska-handlingsplanen-fakta-pm.pdf>)

h GOV.UK, "Government Takes Historic Step Towards Net-Zero With End of Sale of New Petrol and Diesel Cars by 2030," November 18, 2020, (<https://www.gov.uk/government/news/government-takes-historic-step-towards-net-zero-with-end-of-sale-of-new-petrol-and-diesel-cars-by-2030>)

i République Française, "Law n° 2019-1428 of 24 December 2019 on the Orientation of Mobility," (December 26, 2019), (<https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000039666574?r=9iXpFICKqk>)

Table 1. (continued).

Government	ICE phase-out year	Vehicle segments	Policy document (publication date) and quoted target
EUROPE			
Spain	2040	Passenger cars, light commercial vehicles	Law on Climate Change and Energy Transition (2021) ^j <i>That new passenger cars and light commercial vehicles, excluding those registered as historical vehicles, not intended for commercial use, gradually reduce their emissions, so that no later than 2040 they become vehicles with emissions of 0 g CO₂/km.</i>
Germany, Baden-Wuerttemberg (Germany)	2050	Passenger cars	ZEVA commitment (2015) ^k , not yet reflected in national Climate Protection Plan <i>We will strive to make all passenger vehicle sales in our jurisdictions ZEVs (zero-emission vehicles) as fast as possible, and no later than 2050.</i>
NORTH AMERICA			
California (United States)	2035	Passenger vehicles, light-duty vehicles	Executive Order (2020) ^l <i>Executive order directs state to require that, by 2035, all new cars and passenger trucks sold in California be zero-emission vehicles.</i>
Québec (Canada)	2035	Light duty vehicles	Act to increase the number of zero emission motor vehicles in Québec in order to reduce greenhouse gas emissions and other pollutants (2021) ^m <i>The government has set new targets for the electrification of light vehicles: ... that the sale of new gasoline-powered vehicles will be prohibited from 2035.</i>
British Columbia (Canada)	2040	Light duty vehicles	Zero-Emissions Vehicles Act (2021) ⁿ <i>In 2040 and each subsequent year, 100% of all new light-duty motor vehicles sold or leased on British Columbia must be zero-emission vehicles. ... Zero-emission vehicle or ZEV means the following: (a) a motor vehicle that (i) is propelled by electricity or hydrogen from an external source, and (ii) emits no greenhouse gases at least some of the time while the motor vehicle is being operated.</i>
Canada	2040	Light duty vehicles	Canada's actions to reduce emissions (2020) ^o <i>We are reducing this amount by: ... having established light-duty zero-emission vehicles policy sales targets of 10 percent by 2025, 30 percent by 2030, and 100 percent by 2040.</i>
Connecticut, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, Vermont, Washington (United States)	2050	Passenger cars	IZEVA commitment (2015) ^p , not yet reflected in official state or provincial-level strategic documents <i>We will strive to make all passenger vehicle sales in our jurisdictions ZEVs (zero-emission vehicles) as fast as possible, and no later than 2050.</i>
SOUTH AMERICA			
Costa Rica	2050	Light vehicles	National Decarbonization Plan (2019) ^q <i>100% of sales of light vehicles will be zero emission vehicles by 2050 at the latest.</i>

j Boletín Oficial del Estado, "Ley 7/2021, de 20 de mayo, de cambio climático y transición energética [Law 7/2021, of May 20, on climate change and energy transition]," (May 21, 2021), <https://www.boe.es/boe/dias/2021/05/21/pdfs/BOE-A-2021-8447.pdf>

k ZEV Alliance, "International ZEV Alliance Announcement," (December 3, 2015), <http://www.zevalliance.org/international-zev-alliance-announcement/>

l State of California, "Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change," September 23, 2020, <https://www.gov.ca.gov/2020/09/23/governor-newsom-announces-california-will-phase-out-gasoline-powered-cars-drastically-reduce-demand-for-fossil-fuel-in-californias-fight-against-climate-change/>

m Gouvernement du Québec, "Loi visant l'augmentation du nombre de véhicules automobiles zéro émission au Québec afin de réduire les émissions de gaz à effet de serre et autres polluants - Rapport de mise en œuvre 2018-2020 [Act to increase the number of zero-emission motor vehicles in Québec in order to reduce greenhouse gas emissions and other pollutants - report of implementation 2018-2020]," (2021), <https://www.environnement.gouv.qc.ca/changementsclimatiques/vze/rapport-mise-oeuvre-2018-2020.pdf>

n British Columbia, "Zero-Emission Vehicles Act," accessed March 24, 2021, <https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/19029>

o Government of Canada, "Canada's Actions to Reduce Emissions," September 1, 2020, <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/reduce-emissions.html>

p ZEV Alliance, "International ZEV Alliance Announcement," December 3, 2015, <http://www.zevalliance.org/international-zev-alliance-announcement/>

q Government of Costa Rica, "Decarbonization Plan," (2019), <https://2050pathways.org/wp-content/uploads/2019/02/Decarbonization-Plan-Costa-Rica.pdf>

Table 1. (continued).

Government	ICE phase-out year	Vehicle segments	Policy document (publication date) and quoted target
ASIA			
Singapore	2030	Passenger cars	Singapore Green Plan 2030 (2021) ^r and Speech by Minister for Transport (2021) ^s <i>Require all newly registered cars to be of cleaner-energy models from 2030. They can be electric, hybrid, hydrogen fuel cell cars, etc. As these technologies are evolving rapidly, we will monitor developments closely and finalise the definition of registrable models well before 2030.</i>
AFRICA			
Cape Verde	2035	Passenger cars	Electric Mobility Policy Charter (2019) ^t <i>Starting in 2035, prohibit the importation of vehicles equipped with internal combustion engines that use fossil fuel (gasoline or diesel).</i>

^r Singapore Green Plan 2030, "Our Sustainable Development Movement for a Better and Greener Future," (2021), <https://www.greenplan.gov.sg/key-focus-areas/our-targets/>.

^s Ministry of Transport, "Speech by Minister for Transport, Mr. Ong Ye Kung, at the Committee of Supply Debate 2021 on Singapore Green Plan 2020," March 4, 2021, <https://www.mot.gov.sg/News-Centre/news/detail/speech-by-minister-for-transport-mr-ong-ye-kung-at-the-committee-of-supply-debate-2021-on-singapore-green-plan-2030>

^t Ministro da Indústria, Comércio e Energia, "Resolution No. 13/2019," (February 1, 2019), <http://www.ecowrex.org/sites/default/files/documents/projects/cabo-verde-electric-mobility-policy-chapter.pdf>