



POLICIES DRIVING THE EV TRANSITION IN THE UNITED STATES



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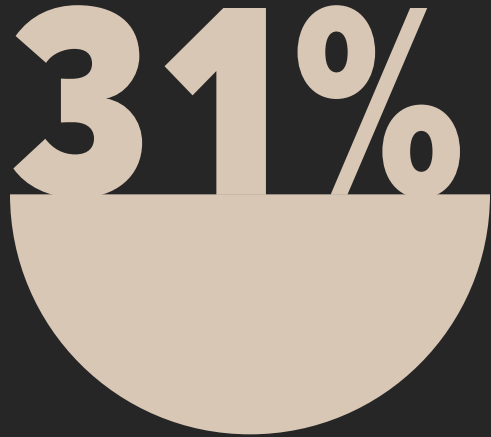
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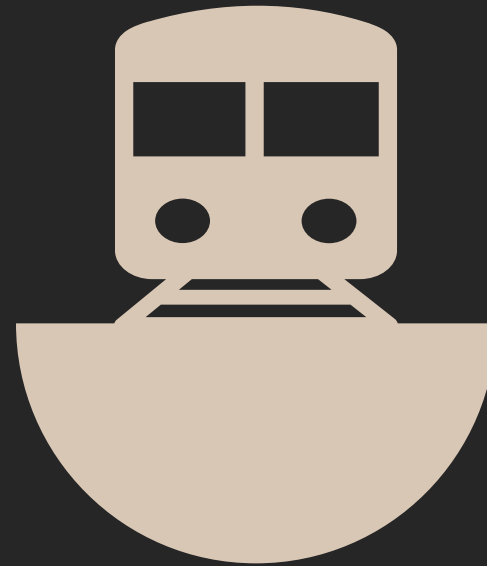
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FAST FACTS

The Dynamic Sustainability Lab™



The U.S. Energy Information Administration predicts electric vehicles will grow from 0.7% of the global light-duty vehicle fleet in 2020 to 31% in 2050, reaching 672 million EVs



Global EV sales reached 6.75 million units in 2021, 108% more than in 2020

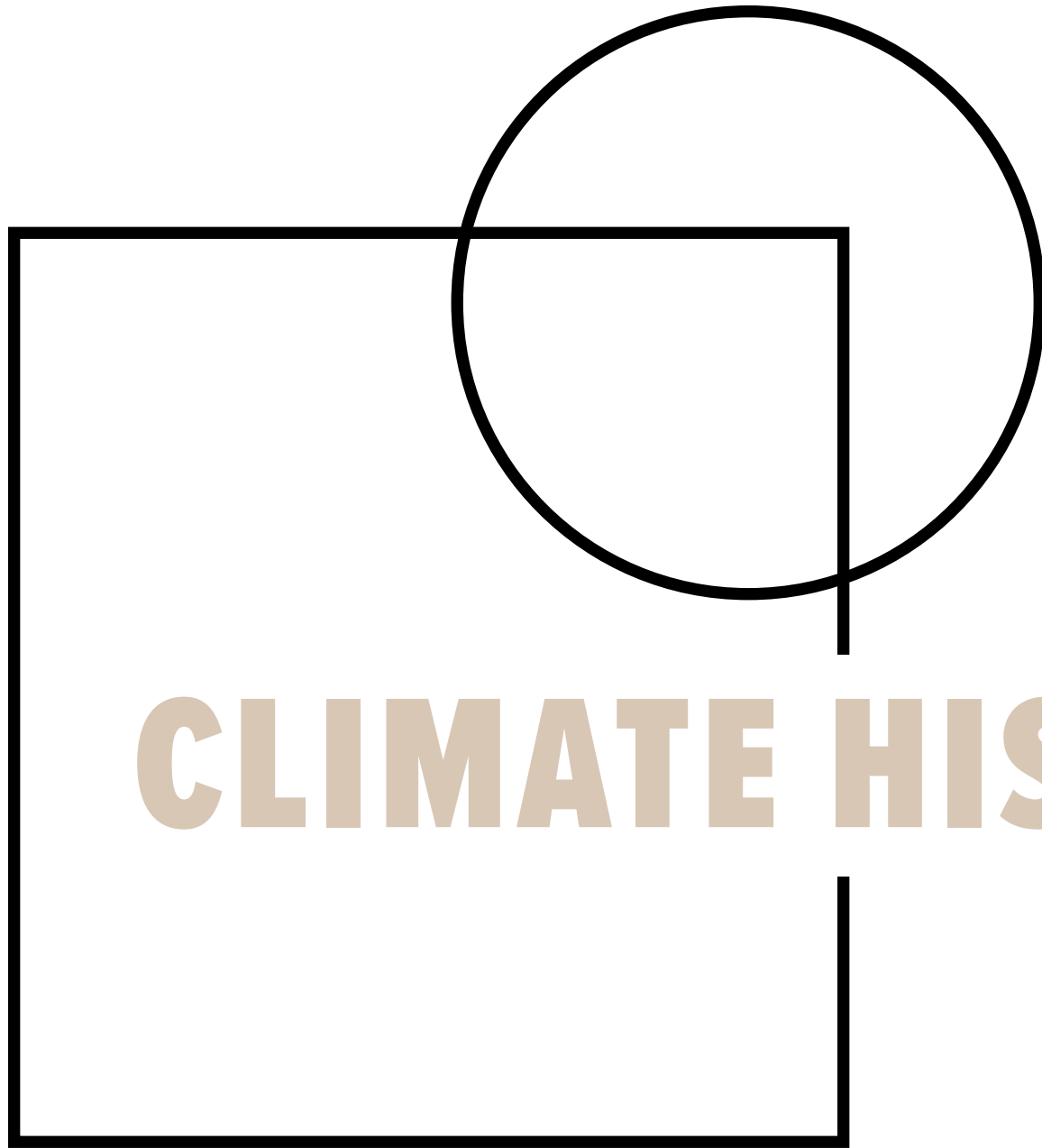
In 2021 the transportation sector had the highest greenhouse emissions in the United States



As of 2021, 47 U.S. states offer incentives to support the EV transition or alternative fuel vehicles and supporting infrastructure



In 2022, there are over 273 million electric vehicles globally



CLIMATE HISTORY.

legacy fossil fuel transportation & climate change

distribution of carbon dioxide emissions produced by the transportation sector worldwide, 2020, by subsector

The global transportation sector is a major polluter accounting for 37% of CO2 emissions and in 2020 produced approximately 7.3 billion metric tons of carbon dioxide (CO2) emissions. Passenger cars were the biggest source of emissions that year, accounting for 41 percent of global transportation emissions.

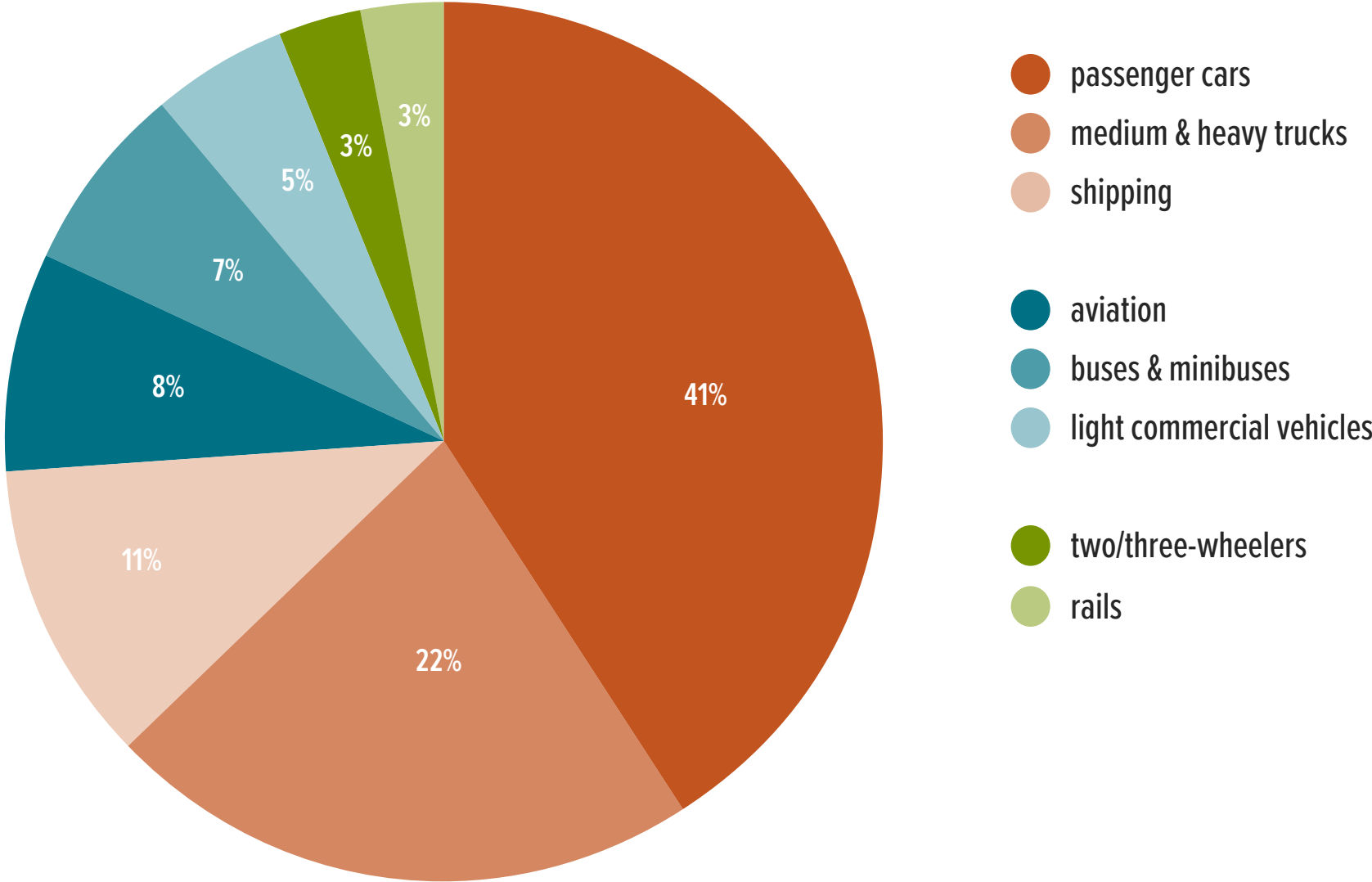


Figure 1 [ref. 01].

GREENHOUSE GAS EMISSIONS FROM THE TRANSPORTATION SECTOR worldwide, 2020, by subsector

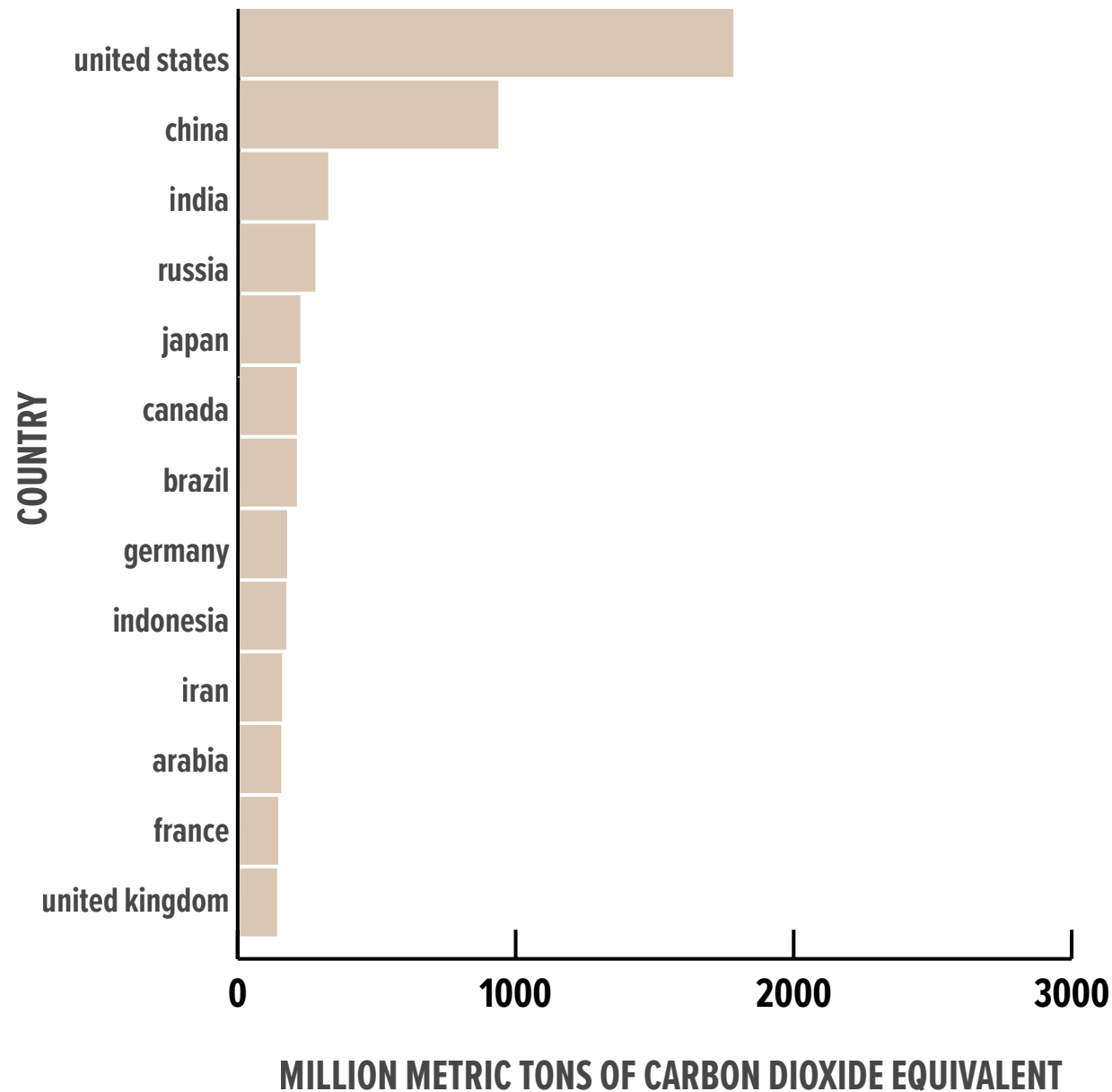


Figure 2 [ref. 02].

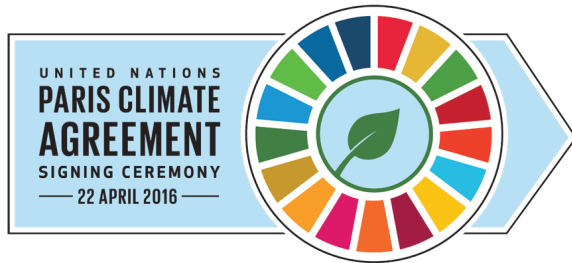
The United States is the biggest producer of transportation emissions worldwide, having emitted 1.76 billion metric tons of CO₂ equivalent in 2018. This was roughly equivalent to the combined transportation emissions of China, India, Russia, and Japan. The U.S. also has the highest road transport emissions per capita worldwide.



DRIVING THE EV TRANSITION

policy examples driving the ev transition

UN PARIS CLIMATE AGREEMENT



The Paris Agreement is a legally binding international treaty on climate change. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

Technology is part of the key strategy both for the long and short term goals in every country.

EU COMMITMENTS



EU regulation 2019/631 defines that by 2025 the average emissions from cars and vans across the EU must have been reduced 15% from the 2021 baseline. It also specifies that 15% of new cars and vans should be zero or low emission by 2025 which is further increased to 35% of cars and 30% of vans by 2030.

UK COMMITMENTS



The United Kingdom wants to lead by example under their net zero emission commitments citing they will achieve net zero emissions by 2050. As part of the netzero plan, in 2021 the government committed to sell an increasing percentage of emissions-free vehicles each year from 2024 onwards with 25% of the government car fleet ultra-low emission by December 2022 and all the government car and van fleet zero emission by 2027.

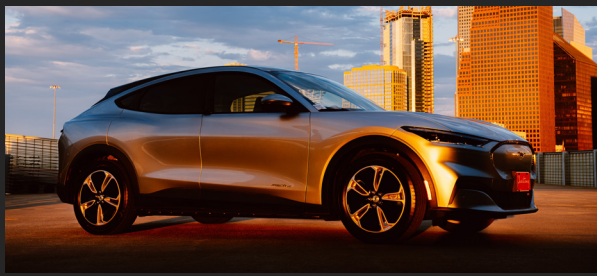
BIDEN ADMINISTRATION COMMITMENTS



Executive Order 14057: Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability states new target aiming at 50-52 Percent Reduction in U.S. Greenhouse Gas Pollution from 2005 Levels in 2030. Under the Build Back Better Framework: Half of all new vehicles sold in 2030 are to be zero-emissions vehicles, including battery electric, plug-in hybrid electric, or fuel cell electric vehicles.

industry examples driving the ev transition

FORD



Ford plans to increase its production capacity of electric vehicles to **600,000 units globally by 2023** and **50% EV by 2050** making the company the second-largest U.S.-based producer of EVs, behind Tesla

VOLKSWAGEN



VW plans to convert **8 major manufacturing plants for EV production** including their headquarters in Wolfsburg as well as **build 6 battery factories in Europe by 2030**

TESLA



In 2020, Tesla held **23% of EV market shares** and in **2022** is supported by the U.S. as the “nation’s largest electric vehicle manufacturer” and has **2.8 million projected shared by 2025**

ABB



ABB is leading the EV charging business, with had sales of **\$220 million in 2020** and the release of the fastest electric-car charger in 2021 which can charge up to four vehicles at once and can **fully charge any EV within 15 minutes**

PROJECTED EV GROWTH



projected electric vehicle growth globally

There are 12 million passenger Evs, one million commercial Evs, and over 260 million electric two-and three-wheelers on the road globally today.

PROJECTED EV PERCENT OF CAR SALES BY SCENARIO

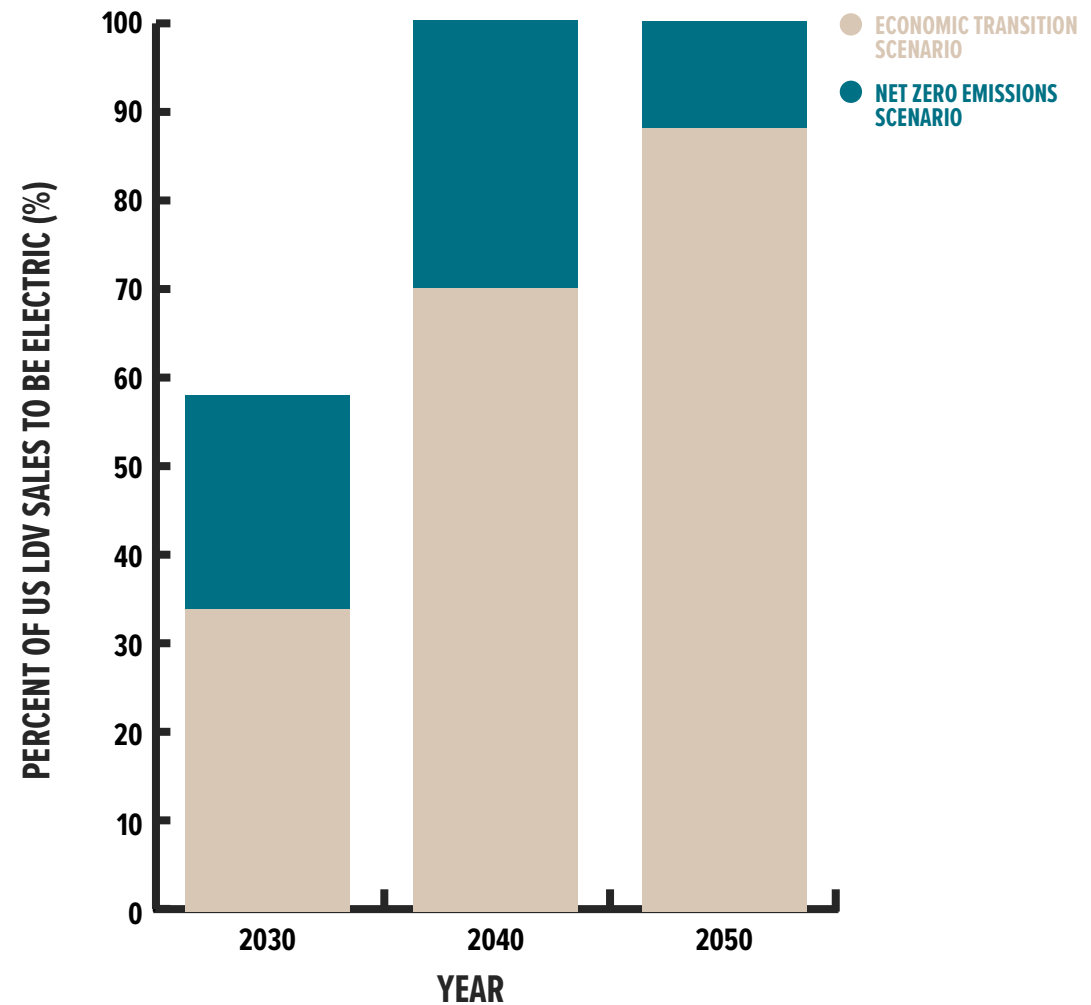
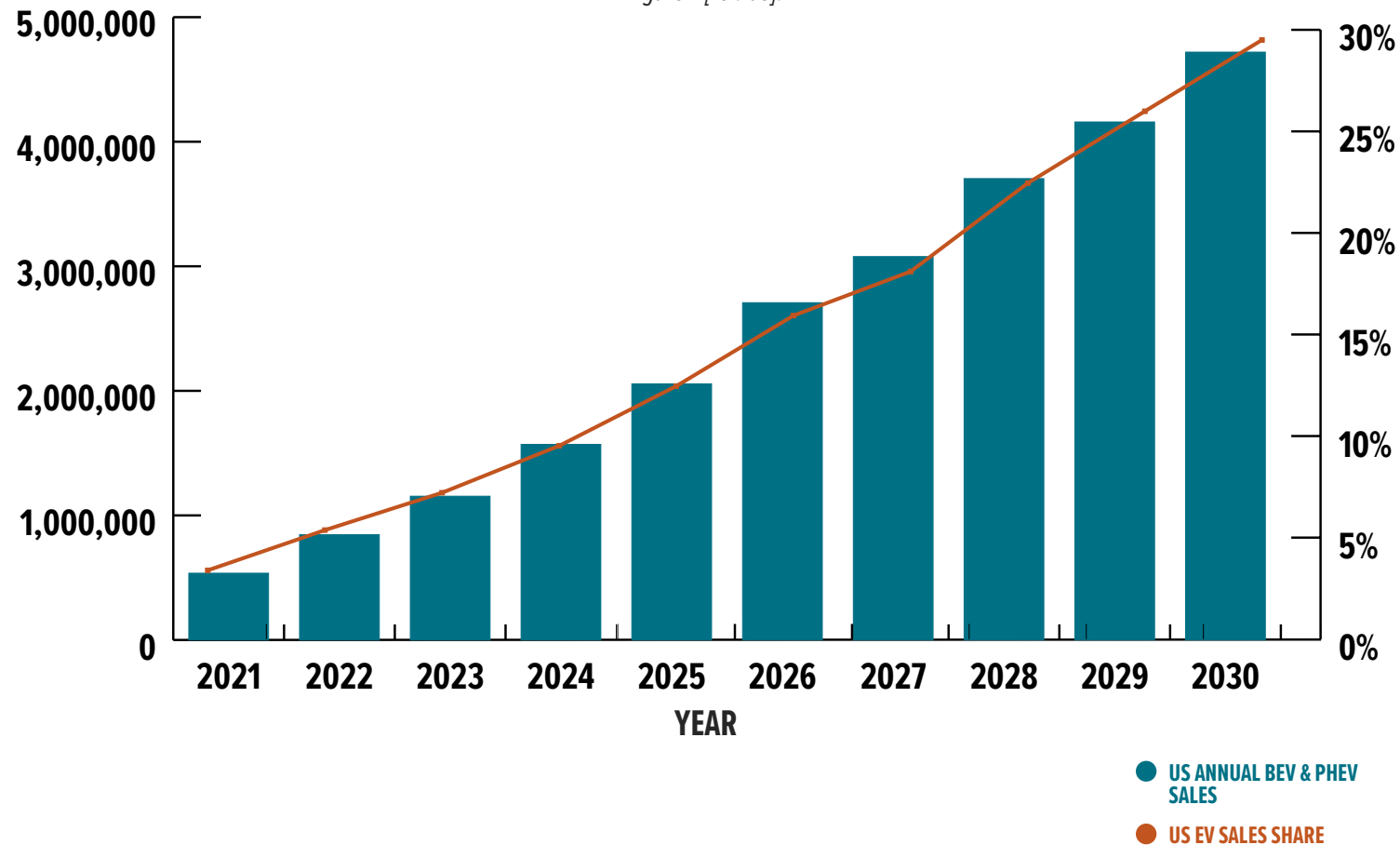


Figure 3: Percent of U.S. car sales to be electric in order to meet net zero emissions goals vs. economically sustainable transition goals. [Also see graph on Bulletin No. 20220303].

US EVs (BEV & PHEV) SALES & SALES FORECAST

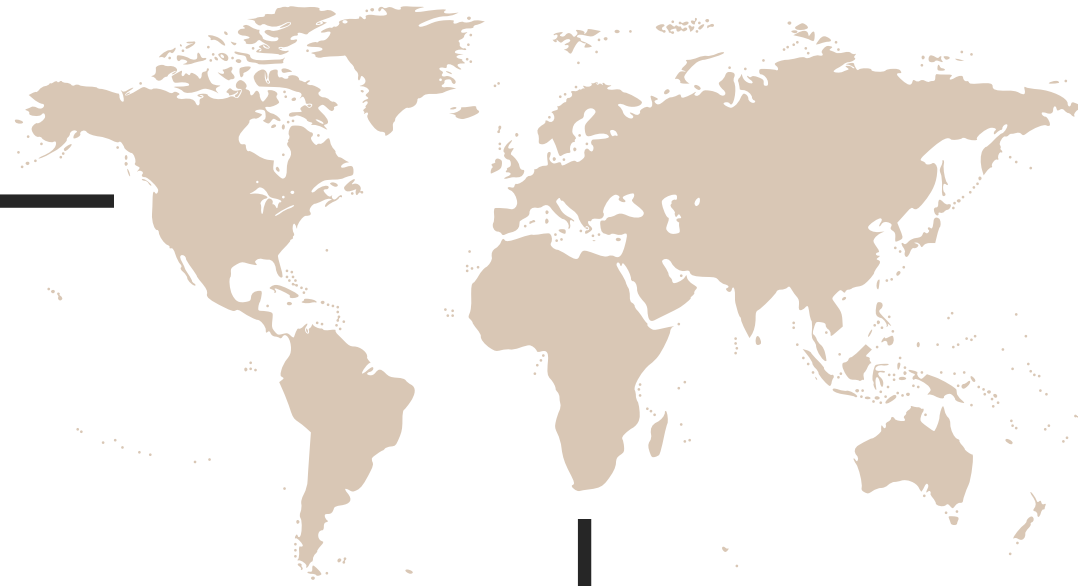
2021 - 2030

Figure 4 [ref. 03].



projection of electric vehicles in the us

In 2013 the Department of Energy invested in the first nationwide charging infrastructure plan. Today, the Biden administration hopes to see half of all vehicles manufactured in the U.S. EVs by 2030.



COUNTRY COMMITMENTS.

European commitments

€3.5 billion

The total funding committed by the United Kingdom to support the transition to zero emission vehicles is £3.5 billion. This includes recent investments for the support the electrification of UK vehicles and their supply chains and infrastructure grants such as residential charge points. Starting in 2021 the government has provided grants of up to £1,500 for electric cars priced under £32,000, with currently around 20 models on the market.

0 emission vehicles

In 2020, the French government announced plans to offer some of the most generous incentives of any country to buy an electric vehicle. Buyers could be eligible to receive up to €12,000.

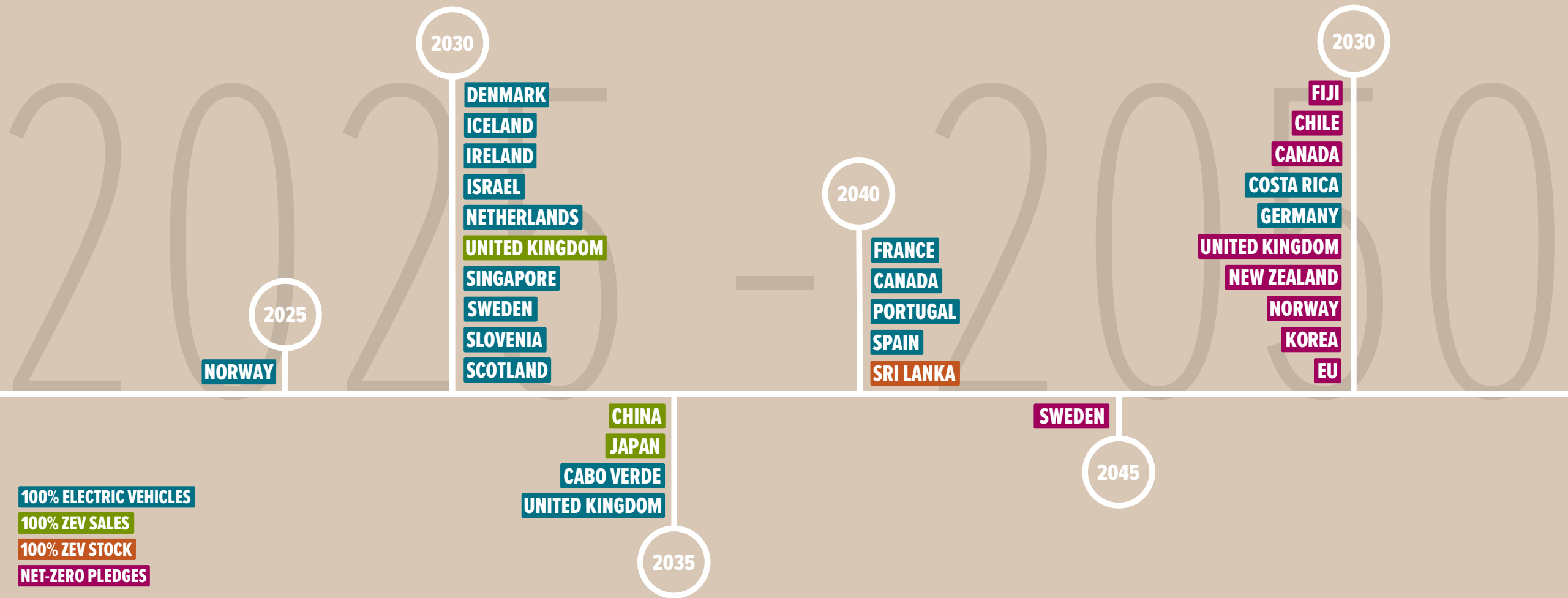
Since the pandemic, EV subsidies have decrease globally. But, European countries such as France, Germany and Italy have continued to lead the way in EV production and purchasing assistance.



Germany's Ministry for Economy and Energy announced before it was too expire in 2021 the grant of up to €9,000 for the purchase of electric vehicles that cost less than €40,000 would be extended through 2025.

In Italy,€ 65 million was allocated in 2021 for vehicles with CO2 emissions between 0-60 g/km CO2 for purchase and leasing. An additional €15,000 were allocated for electric vehicle subsidies.

GLOBAL INTERNAL COMBUSTION ENGINE BANS, ELECTRIFICATION TARGETS, & NET-ZERO EMISSION PLEDGES



100% ELECTRIC VEHICLES
 100% ZEV SALES
 100% ZEV STOCK
 NET-ZERO PLEDGES

THE UNITED STATES' ZERO EMISSION VEHICLE ALLIANCE

1

The California Air Resources Board (CARB) first adopted Zero Emission Vehicle requirements in 1990 as part of the Low Emission Vehicle regulation plan and has continuously pushed EV adaptation.

2

States have looked towards CARB's ZEV policy to develop their own emission standards, As of January 2021 there are currently 13 states that have adopted ZEV standards.

3

ZEV standards require auto manufacturers to produce a more of ZEVs and or hybrid emission vehicles HEVs.

The are 13 Zero Emission Vehicle (ZEV) states: California, New York, Massachusetts, Vermont, Maine, Connecticut, Rhode Island, Washington, Oregon, New Jersey, Maryland, Colorado and Washington, D.C. are setting a precedent for EV adoption. Currently Delaware and Pennsylvania have become lower emission vehicle states, (LEV) states which have looser standards and will adopt ZEV in the future.



ZERO EMISSION VEHICLE (ZEV) STATE STRATEGIES

The Zero Emission Vehicle (ZEV) State Policy Scorecard assesses policy actions of participating ZEV states and tracks changes in policy over time to help inform policymakers and the public about the most effective actions states can take to spur ZEV adoption.

The rankings are calculated using a uniform set of metrics applied to each of the ten ZEV states.

STRATEGIES AND RECOMMENDATIONS FROM THE ZEV TASK FORCE

Consumer Incentives

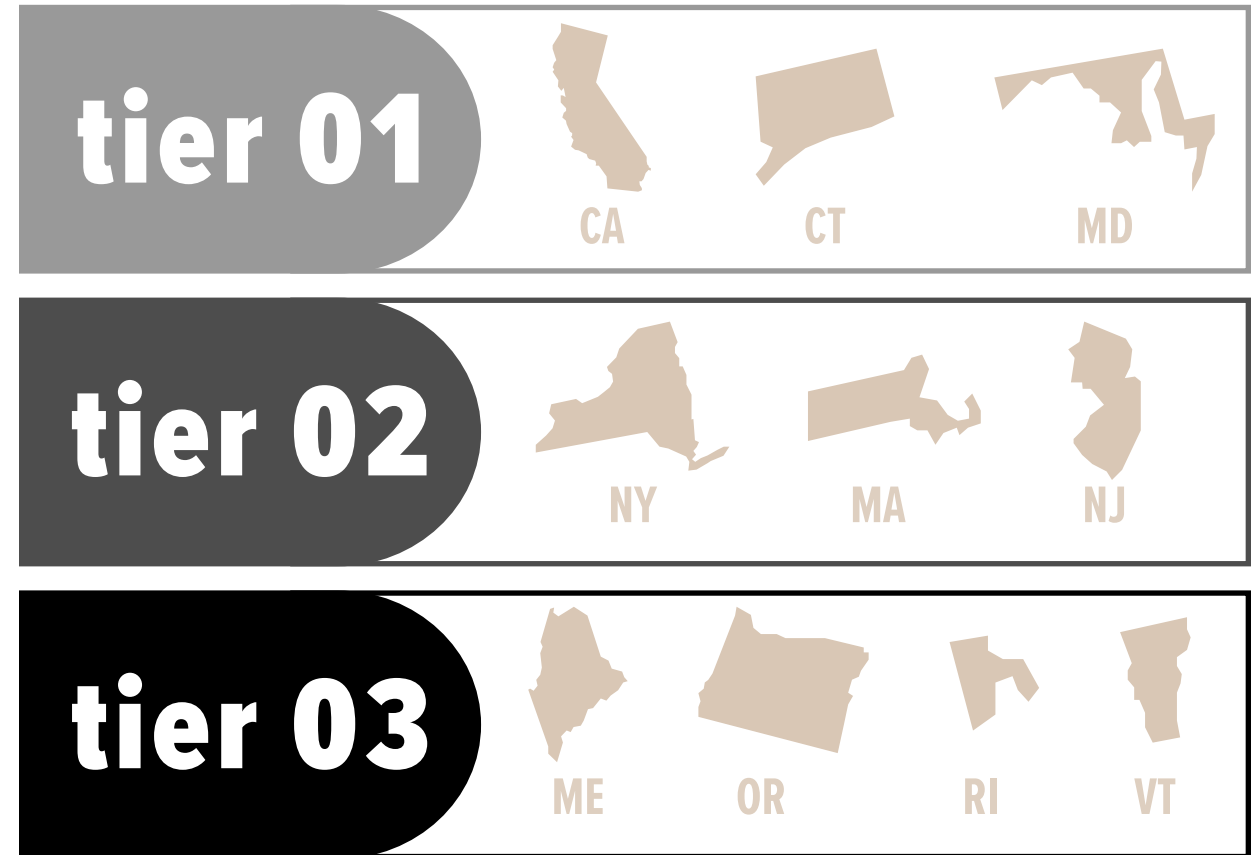
States have introduced new registration fees for EVs, creating a disincentive for adoption

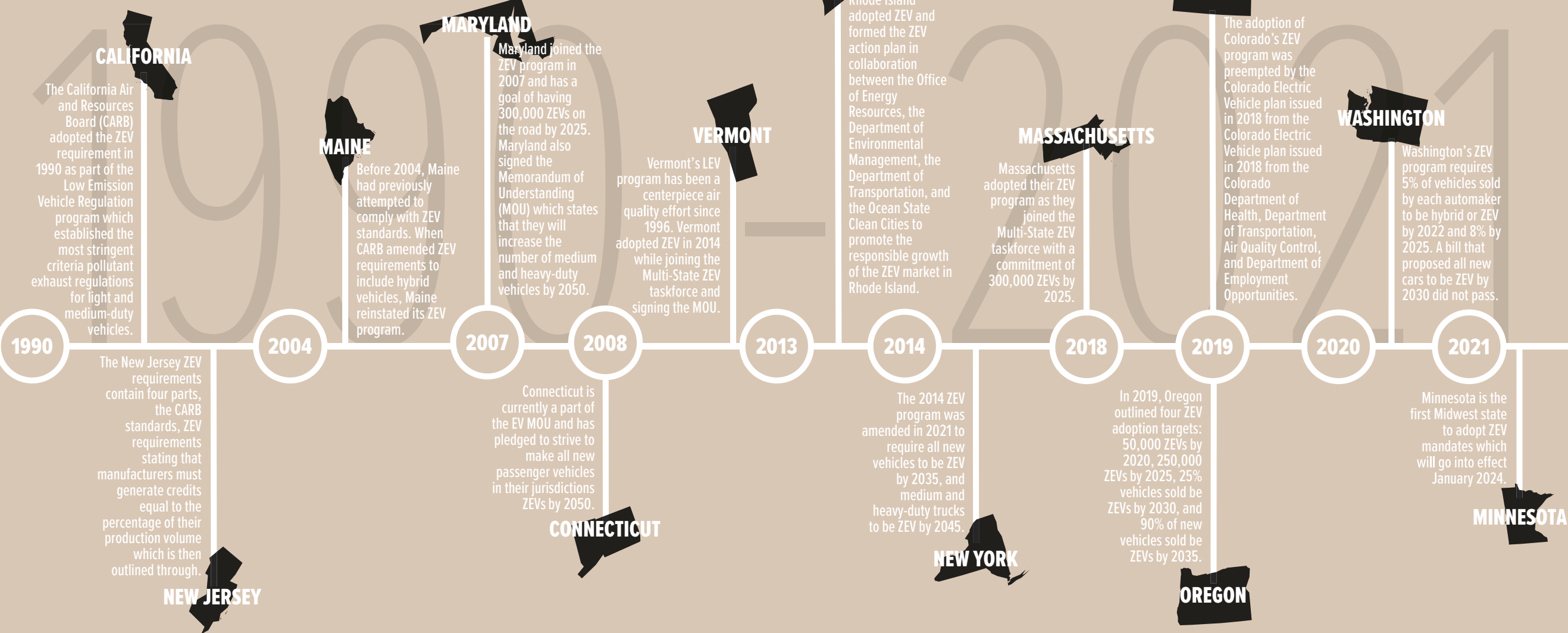
Charging Infrastructure

States offer financial incentives for installing workplace charging stations or adopting workplace charging policies for state facilities

Dealership Incentive

States have programs to reward the dealers who lead the state in overall ZEV sales





1990

CALIFORNIA

The California Air and Resources Board (CARB) adopted the ZEV requirement in 1990 as part of the Low Emission Vehicle Regulation program which established the most stringent criteria pollutant exhaust regulations for light and medium-duty vehicles.

The New Jersey ZEV requirements contain four parts, the CARB standards, ZEV requirements stating that manufacturers must generate credits equal to the percentage of their production volume which is then outlined through.

NEW JERSEY

2004

MAINE

Before 2004, Maine had previously attempted to comply with ZEV standards. When CARB amended ZEV requirements to include hybrid vehicles, Maine reinstated its ZEV program.

2007

MARYLAND

Maryland joined the ZEV program in 2007 and has a goal of having 300,000 ZEVs on the road by 2025. Maryland also signed the Memorandum of Understanding (MOU) which states that they will increase the number of medium and heavy-duty vehicles by 2050.

2008

VERMONT

Vermont's LEV program has been a centerpiece air quality effort since 1996. Vermont adopted ZEV in 2014 while joining the Multi-State ZEV taskforce and signing the MOU.

2013

RHODE ISLAND

Rhode Island adopted ZEV and formed the ZEV action plan in collaboration between the Office of Energy Resources, the Department of Environmental Management, the Department of Transportation, and the Ocean State Clean Cities to promote the responsible growth of the ZEV market in Rhode Island.

2014

MASSACHUSETTS

Massachusetts adopted their ZEV program as they joined the Multi-State ZEV taskforce with a commitment of 300,000 ZEVs by 2025.

The 2014 ZEV program was amended in 2021 to require all new vehicles to be ZEV by 2035, and medium and heavy-duty trucks to be ZEV by 2045.

NEW YORK

2018

COLORADO

The adoption of Colorado's ZEV program was preempted by the Colorado Electric Vehicle plan issued in 2018 from the Colorado Electric Vehicle plan issued in 2018 from the Colorado Department of Health, Department of Transportation, Air Quality Control, and Department of Employment Opportunities.

In 2019, Oregon outlined four ZEV adoption targets: 50,000 ZEVs by 2020, 250,000 ZEVs by 2025, 25% vehicles sold be ZEVs by 2030, and 90% of new vehicles sold be ZEVs by 2035.

OREGON

2020

WASHINGTON

Washington's ZEV program requires 5% of vehicles sold by each automaker to be hybrid or ZEV by 2022 and 8% by 2025. A bill that proposed all new cars to be ZEV by 2030 did not pass.

Minnesota is the first Midwest state to adopt ZEV mandates which will go into effect January 2024.

MINNESOTA

2021





HOW THE EV TRANSITION IS BEING FINANCED

EV TAX BENEFITS & INCENTIVES IN THE EU, 2020

Figure 5 [ref. 04].

		TAX BENEFITS			INCENTIVES			TAX BENEFITS			INCENTIVES
		acquisition	ownership	company car		acquisition	ownership	company car			
	austria	✓	✓	✓	✓		italy	✗	✓	✗	✓
	belgium	✓	✓	✓	✗		latvia	✓	✓	✓	✗
	bulgaria	✗	✓	✗	✗		lithuania	✗	✗	✗	✗
	croatia	✓	✓	✗	✓		luxembourg	✗	✓	✓	✓
	cyprus	✓	✓	✗	✗		malta	✓	✓	✗	✗
	czech republic	✓	✓	✗	✓		netherlands	✓	✓	✓	✓
	denmark	✓	✓	✗	✗		poland	✓	✗	✗	✗
	estonia	✗	✗	✗	✓		portugal	✓	✓	✓	✓
	finland	✓	✓	✓	✓		romania	✗	✓	✗	✓
	france	✓	✗	✓	✓		slovakia	✓	✓	✗	✗
	germany	✓	✓	✓	✓		slovenia	✓	✗	✗	✓
	greece	✓	✓	✓	✓		spain	✓	✓	✓	✓
	hungary	✓	✓	✓	✓		sweden	✗	✓	✗	✓
	ireland	✗	✓	✓	✓						



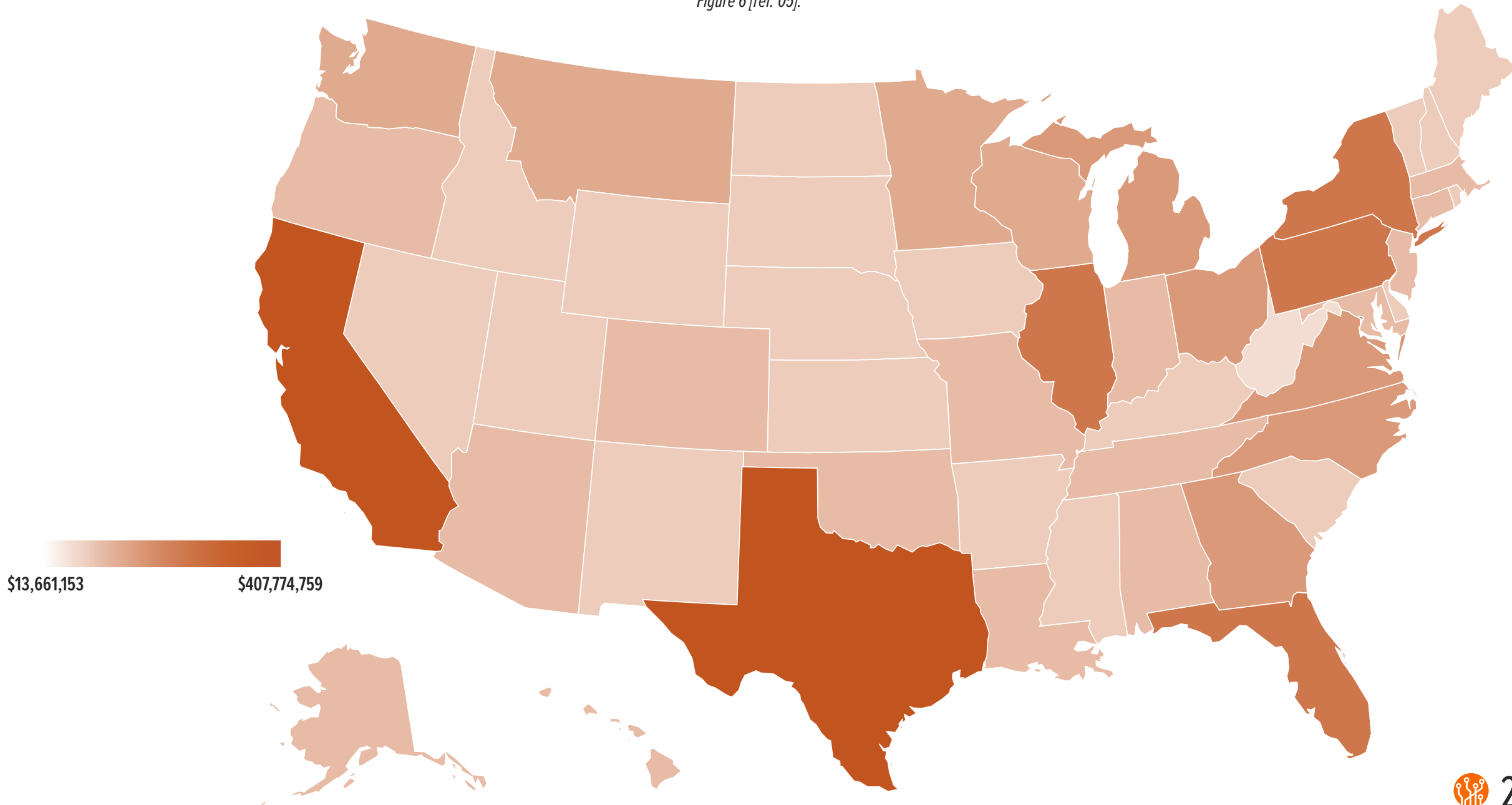
NATIONAL ELECTRIC VEHICLE INFRASTRUCTURE (NEVI) FORMULA PROGRAM

On February 10, 2022 the Biden Administration announced nearly \$5 billion that will be made available under the new National Electric Vehicle Infrastructure (NEVI) Formula Program established by President Biden’s Bipartisan Infrastructure Law, to build out a national electric vehicle charging network, an important step towards making electric vehicle (EV) charging accessible to all Americans. The program will provide nearly \$5 billion over five years to help states create a network of EV charging stations along designated Alternative Fuel Corridors, particularly along the Interstate Highway System. The total amount available to states in Fiscal Year 2022 under the NEVI Formula Program is \$615 million. States must submit an EV Infrastructure Deployment Plan before they can access these funds. A second, competitive grant program designed to further increase EV charging access in locations throughout the country, including in rural and underserved communities, will be announced later this year.

5-YEAR NATIONAL ELECTRIC VEHICLE INFRASTRUCTURE FUNDING

BY STATE

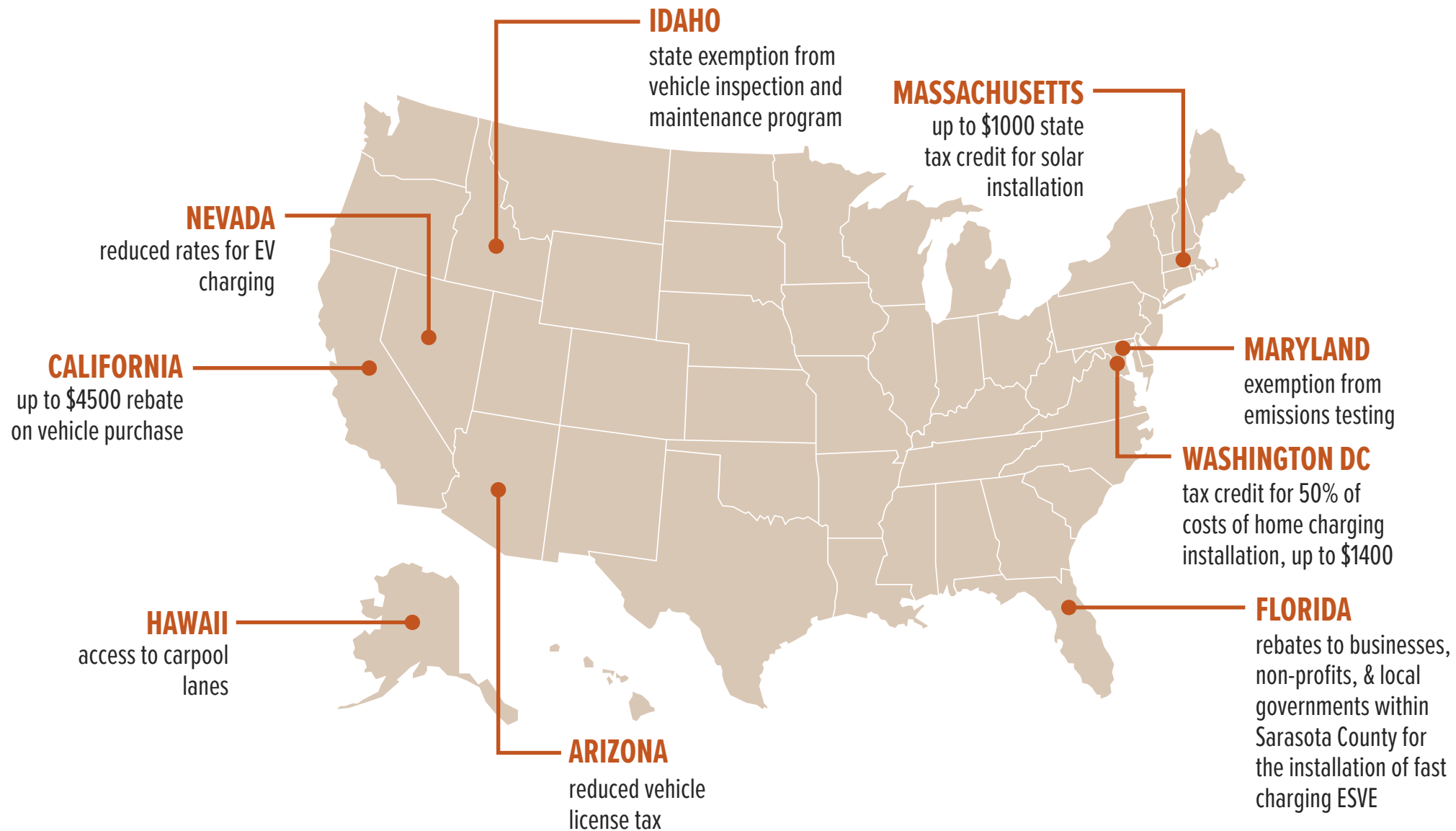
Figure 6 [ref. 05].



EXAMPLES OF EV INITIATIVES IN DIFFERENT STATES IN THE US, 2020

The electric vehicle transition is leveraging incentives to support the bottom up process of adopting this progressing technology. Legislative incentives include measures that provide high-occupancy vehicle (HOV) lane exemptions, financial incentives for purchasing electric vehicles or electric vehicle supply equipment (EVSE), vehicle inspections or emissions test exemptions, parking incentives and utility rate reductions. Utilities also offer incentives, rebates, and grants for transportation electrification. One of the most common incentives is price reductions for charging EVs during off-peak hours.

Figure 7 [ref. 06].



cutting the costs of EVs

All-electric and plug-in hybrid cars purchased new in or after 2010 may be eligible for a federal income tax credit of up to \$7,500. The credit amount will vary based on the capacity of the battery used to power the vehicle. The federal tax credit is the only vehicle purchasing incentive in 41 states. The upfront costs of EVs are often the consumer's largest concern, financial support from both state and government are integral in widespread accessibility for the consumer market.

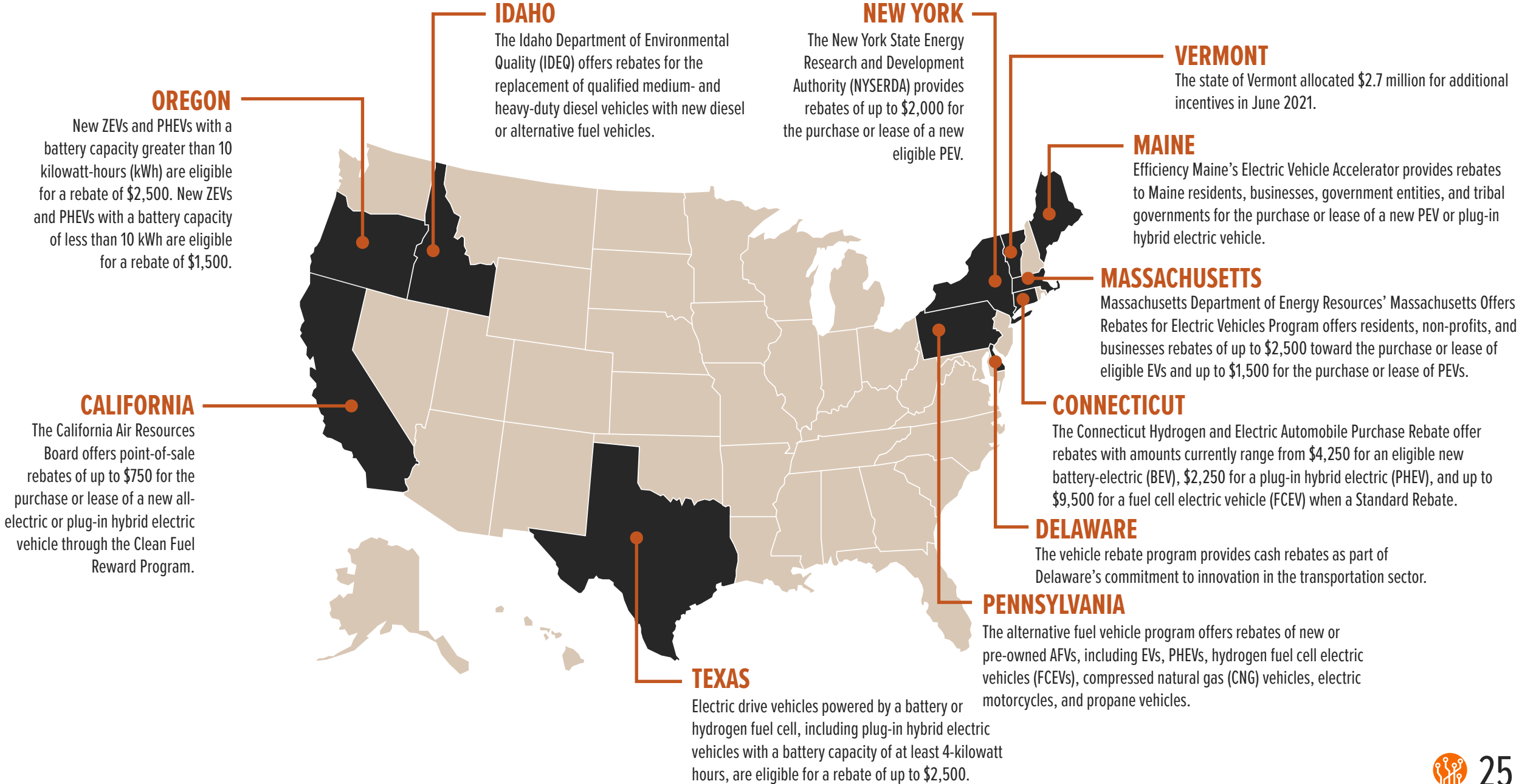
potential calculated cost of 2020 ford focus ev in california with US incentives



car + residential charger costs	29,120 + 800 = 29,920
federal tax credit	up to \$7,500
california EV rebate	up to \$7,000
the clean vehicle rebate project (CVRP)	up to \$7,000
EVSE rebate	\$200
residential electric vehicle supply equipment (EVSE) financing program	covers upfront cost
potential net cost	\$7,620

STATES WITH EV PURCHASE INCENTIVES THROUGH REBATE

Figure 8 [ref. 07].



new york state department of environmental conservation municipal rebate program



The Climate Smart Communities (CSC) Grant program was established in 2016 to provide 50/50 matching grants to cities, towns, villages, and counties of the State of New York and boroughs of New York City for eligible climate change mitigation, adaptation, and planning and assessment projects. The program provides rebates for costs associated with the purchase or lease (for at least 36 months) of eligible clean vehicles, and installation of eligible infrastructure that supports public use of clean vehicles. To be eligible, the primary purpose of a facility must be the charging or fueling of clean vehicles by the public.



EVSE

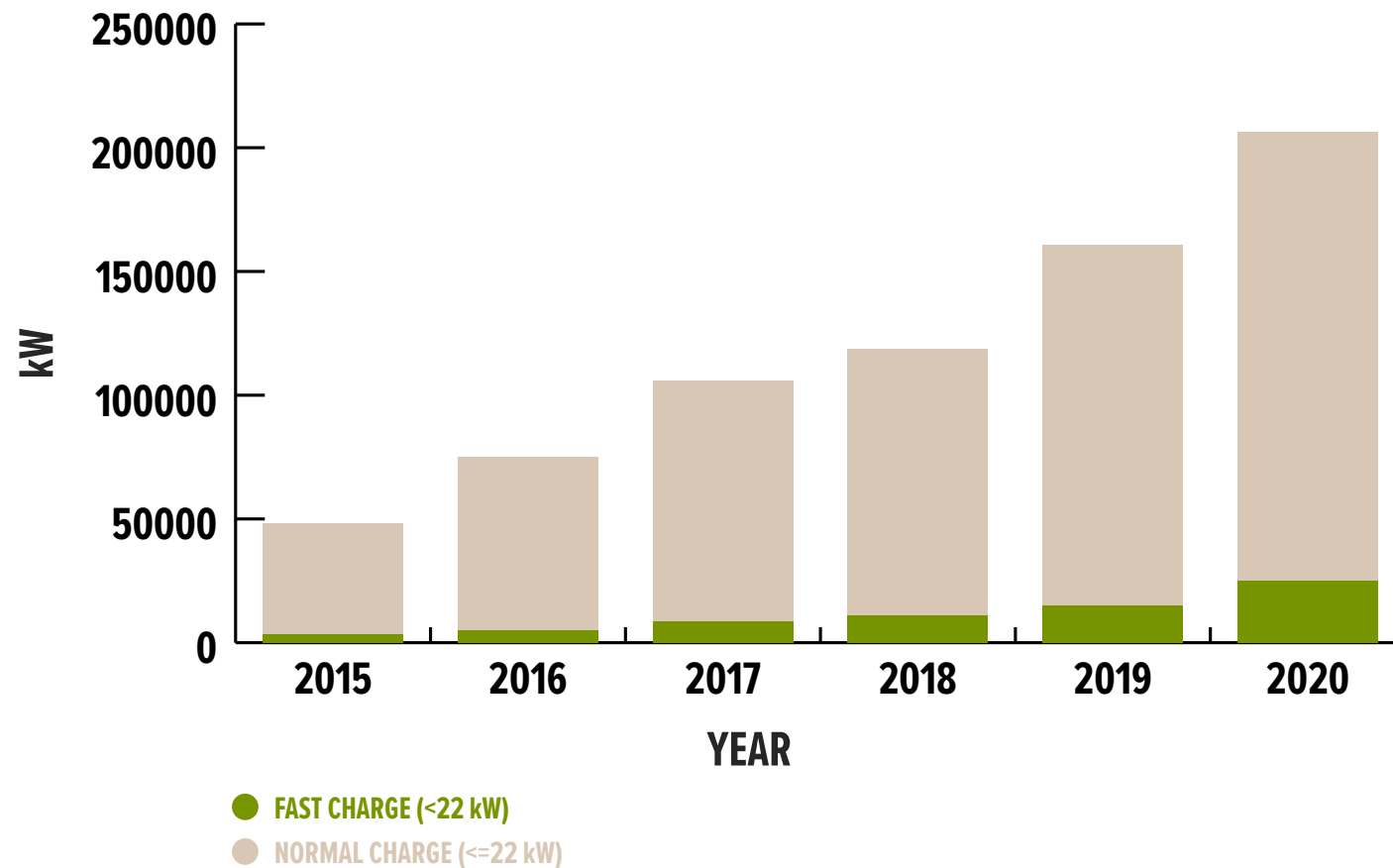
Electric vehicle supply equipment (EVSE) supplies electricity to an electric vehicle. Commonly called charging stations or charging docks, they provide electric power to the vehicle and use that to recharge the vehicle's batteries. EVSE systems include the electrical conductors, related equipment, software, and communications protocols that deliver energy efficiently and safely to the vehicle.

EUROPEAN EVSE

EUROPEAN NORMAL & HIGH-POWER PUBLIC RECHARGING POINTS

2020

Figure 9 [ref. 08].



By 2030, 3 million public charge points will be needed for 40 million EVs, at an estimated cost of €20bn.

The EU charging infrastructure is lagging strong EV market growth, with only 224,237 public charging points deployed in 2020 – of which 66% are concentrated in just five countries (the Netherlands, Germany, France, Austria and Italy). For the EU to achieve its charging infrastructure target by 2025, the European Court of Auditors (ECA) estimates that approximately 150,000 new charging points will be needed each year, or roughly 3,000 per week.

EUROPEAN EVSE

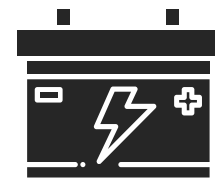
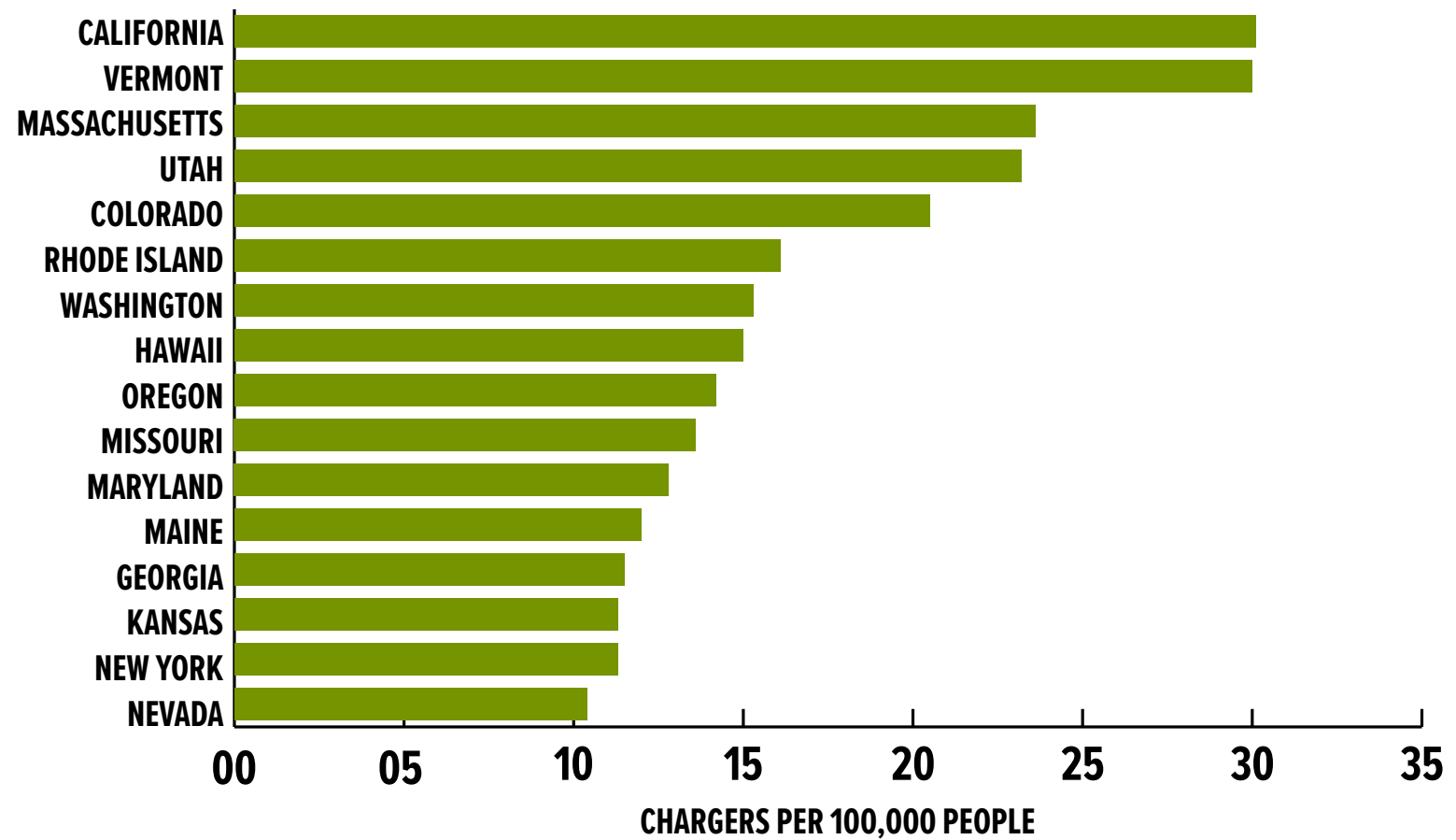
In 2013, the European Commission addressed the need for the development of a Europe-wide network travel to be completed by 2050 called the Trans-European Transport Network (TEN-T). TEN-T can accommodate EV momentum in Europe and prioritise full coverage of electric-charging infrastructure. Connecting Europe Facility (CEF) is a key EU funding instrument for targeted infrastructure investment at European level. Between 2014 and December 2020, grants of approximately €698 million to accelerate investments in Europe's transport, energy and digital infrastructure networks were awarded.



The United States is greatly lagging in ESVE supply. On average in 2021, the EU offers five fast public chargers for every 100 km. In lagging states like South Dakota, chargers can be as far away as 554 miles with only a total of 148 PC.

CHARGERS BY STATE PER CAPITA 2021

Figure 10 [ref. 09].



Only **8 states** have over 15 charging stations per 100k in population

states leading in ev & ev supply equipment

STATES WITH THE GREATEST NUMBER OF INCENTIVES
2021

Figure 11 [ref. 10].

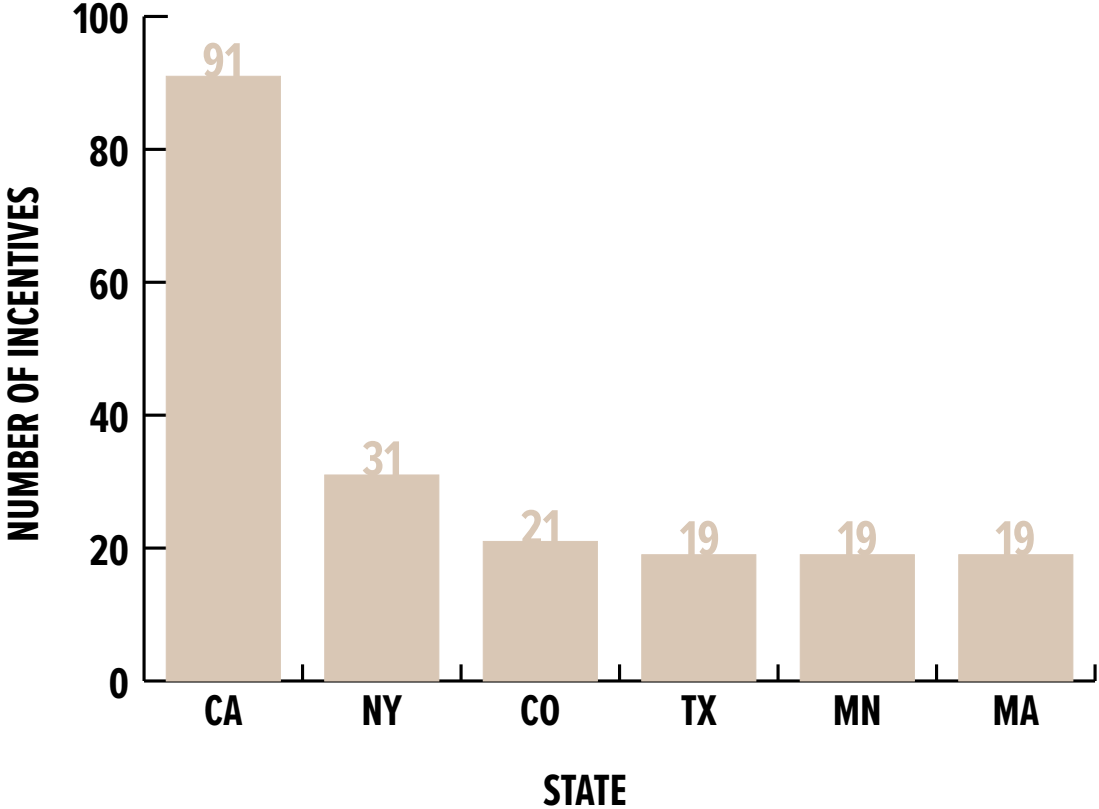
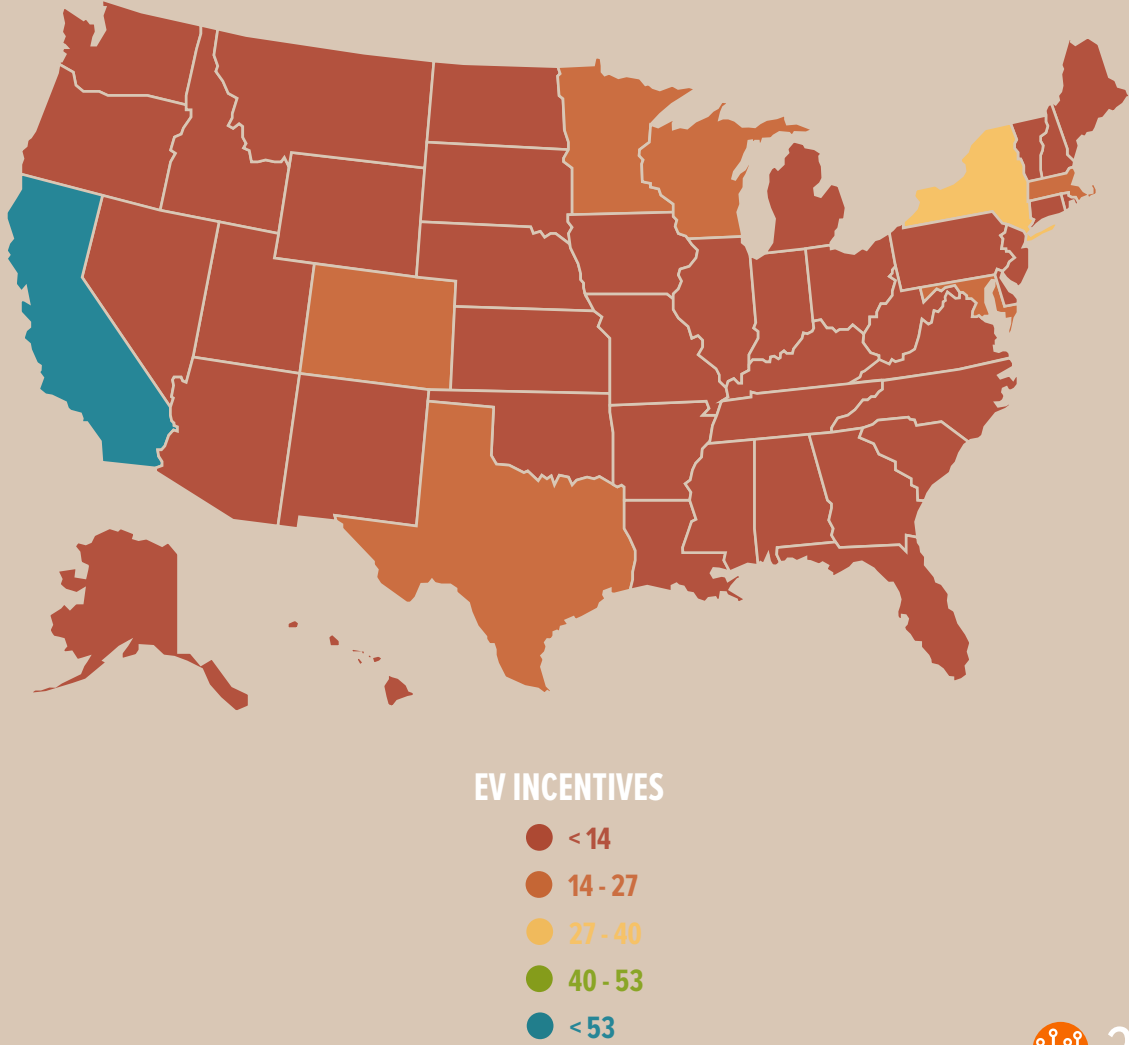


Figure 12 [ref. 11].





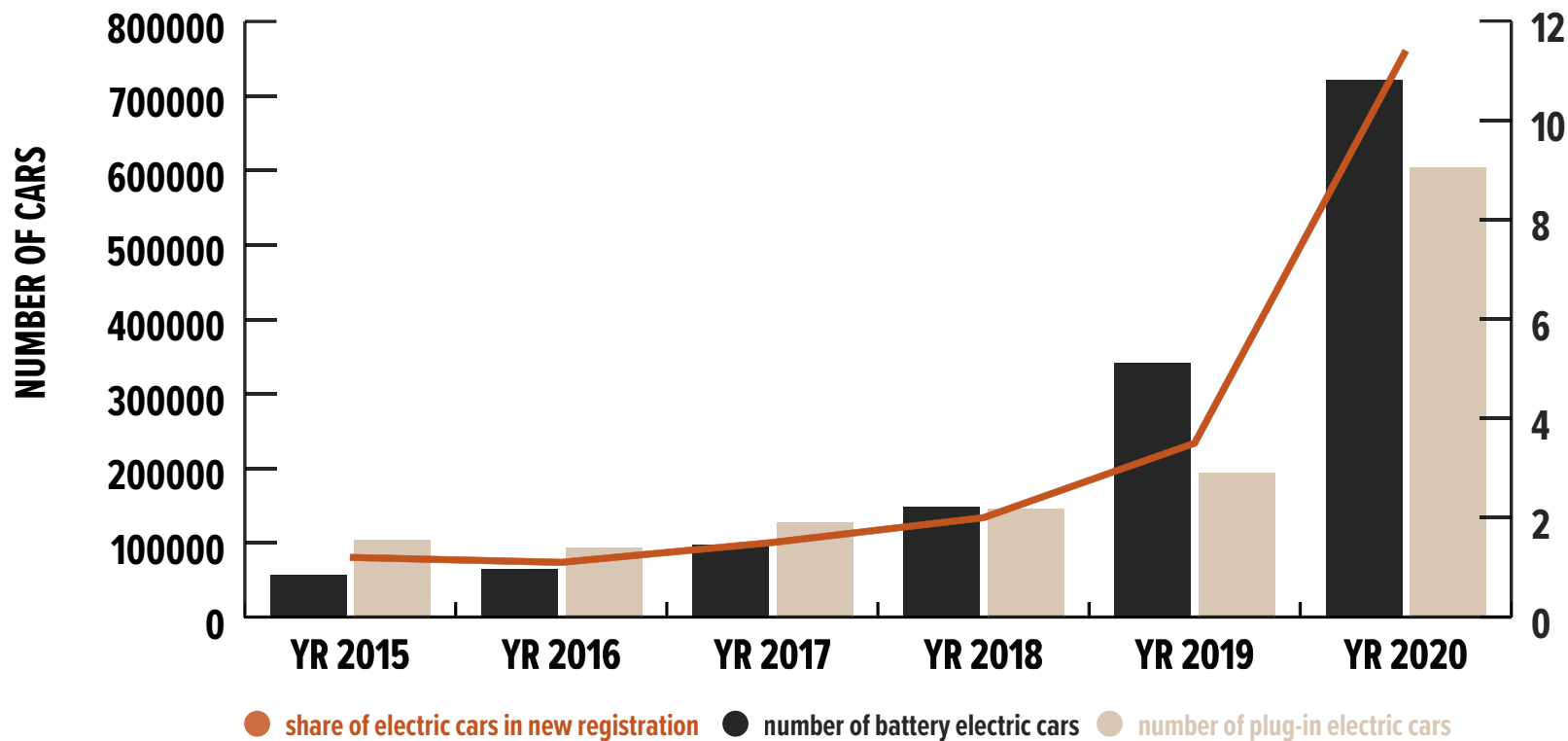
EV FLEETS

EUROPEAN FLEET COMMITMENTS

electric cars registered in the EU-27, iceland, norway, and the united kingdom

2015 - 2021

Figure 13 [ref. 12].



At 63 million vehicles, fleet accounts for 20% of the total European vehicle parc, travels more than 40% of total vehicle kilometers and contributes half of total emissions from road transport.

The UK Government is committed to electrifying the fleet of central government cars. In the 2017 Autumn Budget, it was pledged that 25% of this fleet would be electrified by 2022. The Road to Zero Strategy outlined further commitments, with it stating 100% of central government car fleet would be electric by 2030.

HOW U.S. STATES ARE LEADING IN FLEET POLICY



washington

THE ELECTRIC FLEET INITIATIVE

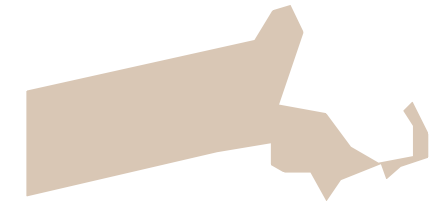
Launched in December 2015, established the goal that at least 20% of all new state passenger vehicle purchases would be electric vehicles by 2017. Currently the state fleet includes more than 120 EVs. In 2019, Governor Inslee increased the State Electric Fleets initiative from 30% to 50% of all new vehicle acquisitions.



california

FLEET VEHICLE PROCUREMENT REQUIREMENTS

When awarding a vehicle procurement contract, every city, county, and special district, including school and community college districts, may require that 75% of the passenger cars and/or light-duty trucks acquired be energy-efficient vehicles.



massachusetts

STATE FLEET PROCUREMENT

Acquire ZEVs so that the total state fleet consists of: 5% ZEVs in 2025; 20% ZEVs in 2030; 75% ZEVs in 2040; and 100% ZEVs in 2050- Increase the total number of electric vehicle supply equipment (EVSE) on state properties to: 350 EVSE in 2025; and 500 EVSE in 2030.

36%

of Fortune 500 companies are achieving their current climate targets

74

companies have set Science Based Targets

56

companies have committed to RE100

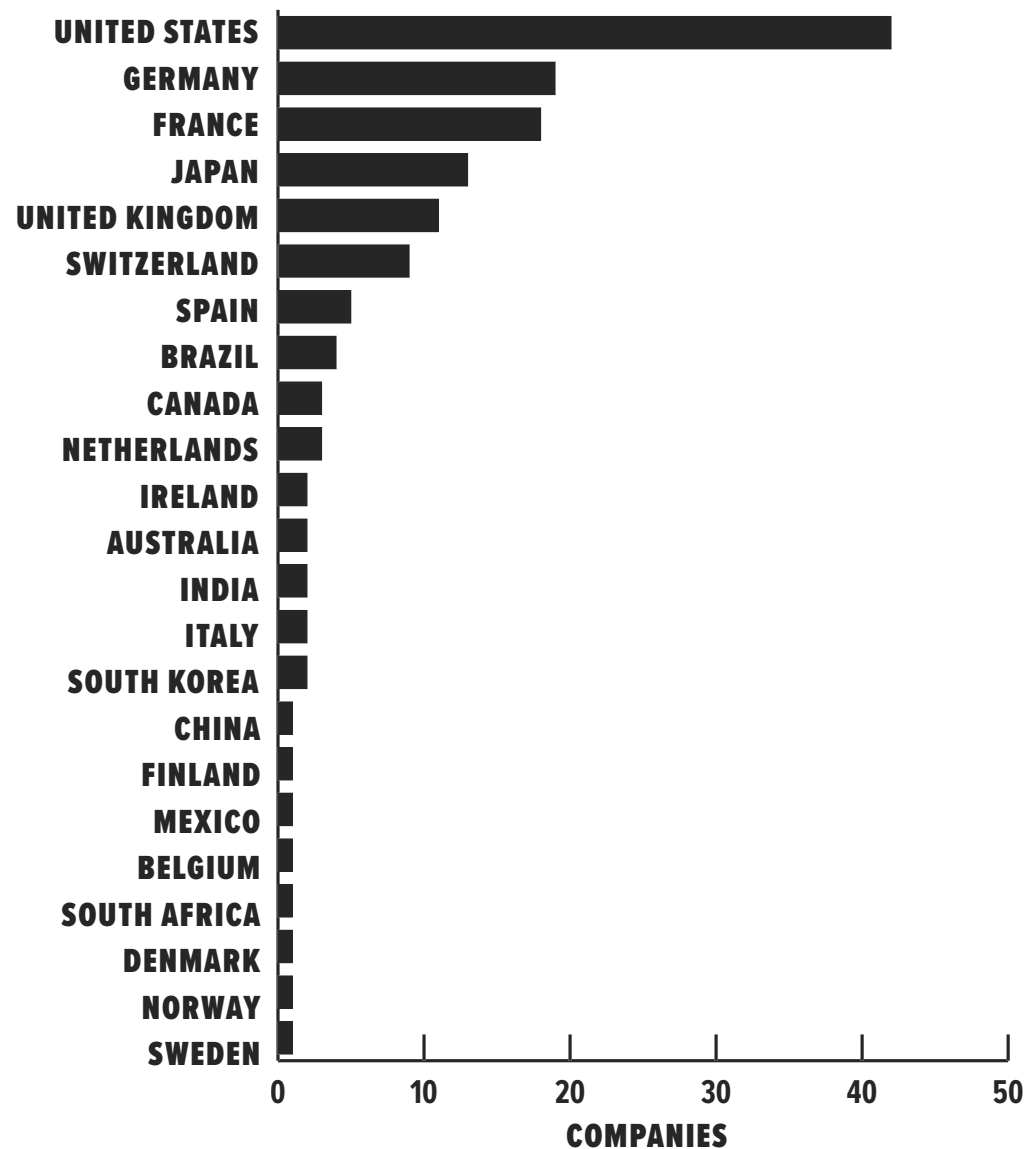
91

companies are carbon neutral

fortune 500 companies with climate goals

BY COUNTRY, 2020

Figure 14 [ref. 13].





FORTUNE 500 COMPANIES W FLEET COMMITMENTS

AS OF 2021

CORPORATE FLEETS



UPS

UPS have announced an order of 10,000 electric vehicles from UK manufacturer Arrival. The initial 10,000 vehicles will be rolled out in the UK, Europe and North America from 2020 to 2024.



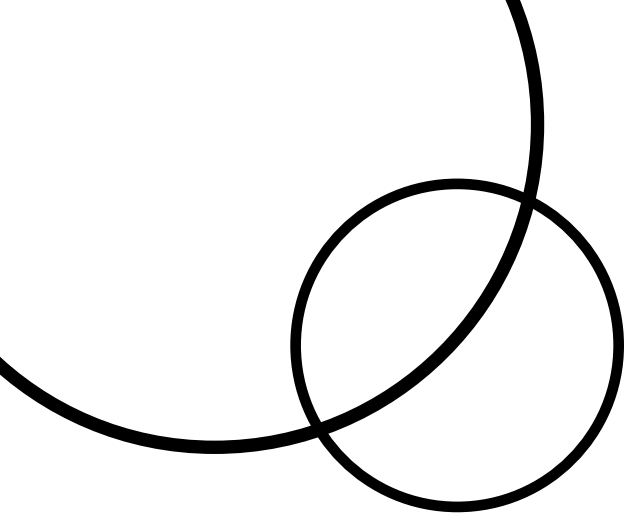
AMAZON

Amazon plans to have 10,000 EVs by 2022, and 100,000 by 2030 from electric vehicle manufacturer Rivian and plans to expand the vehicles to as many as 15 additional cities in 2021. The electric vehicles will help Amazon reach its goal of being carbon neutral by 2040 for their Climate Pledge.



FEDEX

By 2025, 50% of FedEx Express global PUD vehicle purchases will be electric, rising to 100% of all purchases by 2030. Achieving FedEx's commitment to carbon neutral operations by 2040 will be achieved through an all-electric, zero-emission pickup and delivery (PUD) fleet will be accomplished through phased programs to replace existing vehicles.



Medium and Heavy Trucks (MDHDVs) and buses accounted for 24% of U.S. transportation energy use in 2018.

States that have existing EV policy and incentives are now highlighting MDHDVs as an important focus in the EV transition.

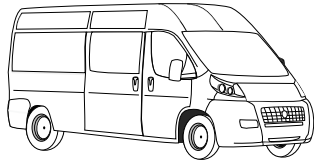
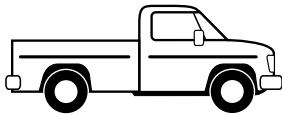
California’s Advanced Clean Trucks Rule requires truck makers to sell an increasing number of clean, zero-emission trucks in California in place of dirty diesel and gasoline; will cut toxic fossil fuel emissions in polluted communities throughout the state.

International Council on Clean Transportation states that “Achieving a cleaner freight transport system will depend not only on a farsighted approach to regulating vehicle emissions and efficiency but also on developing an effective model for systemic change that includes measures to shift freight to the most sustainable modes and optimize supply chain activity.”

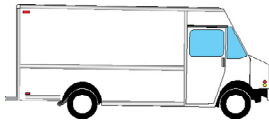
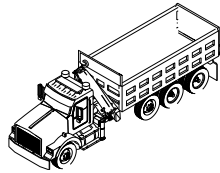
FOCUS ON MEDIUM- AND HEAVY-DUTY EVs IN FLEETS

WEIGHT CLASS

2B-3



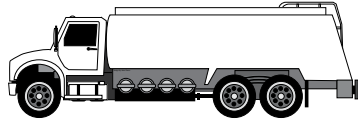
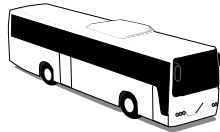
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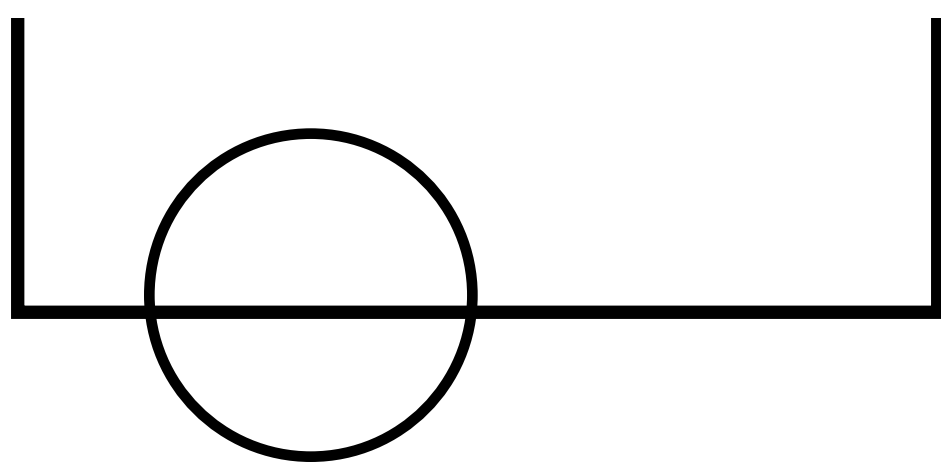
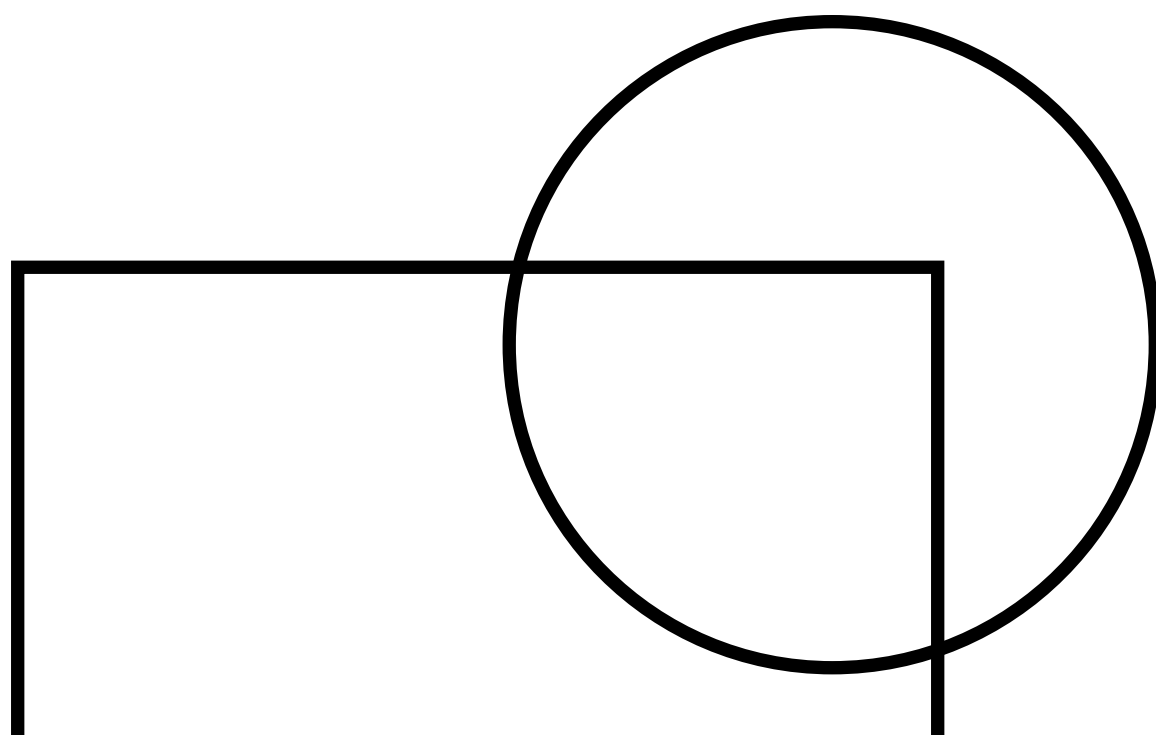


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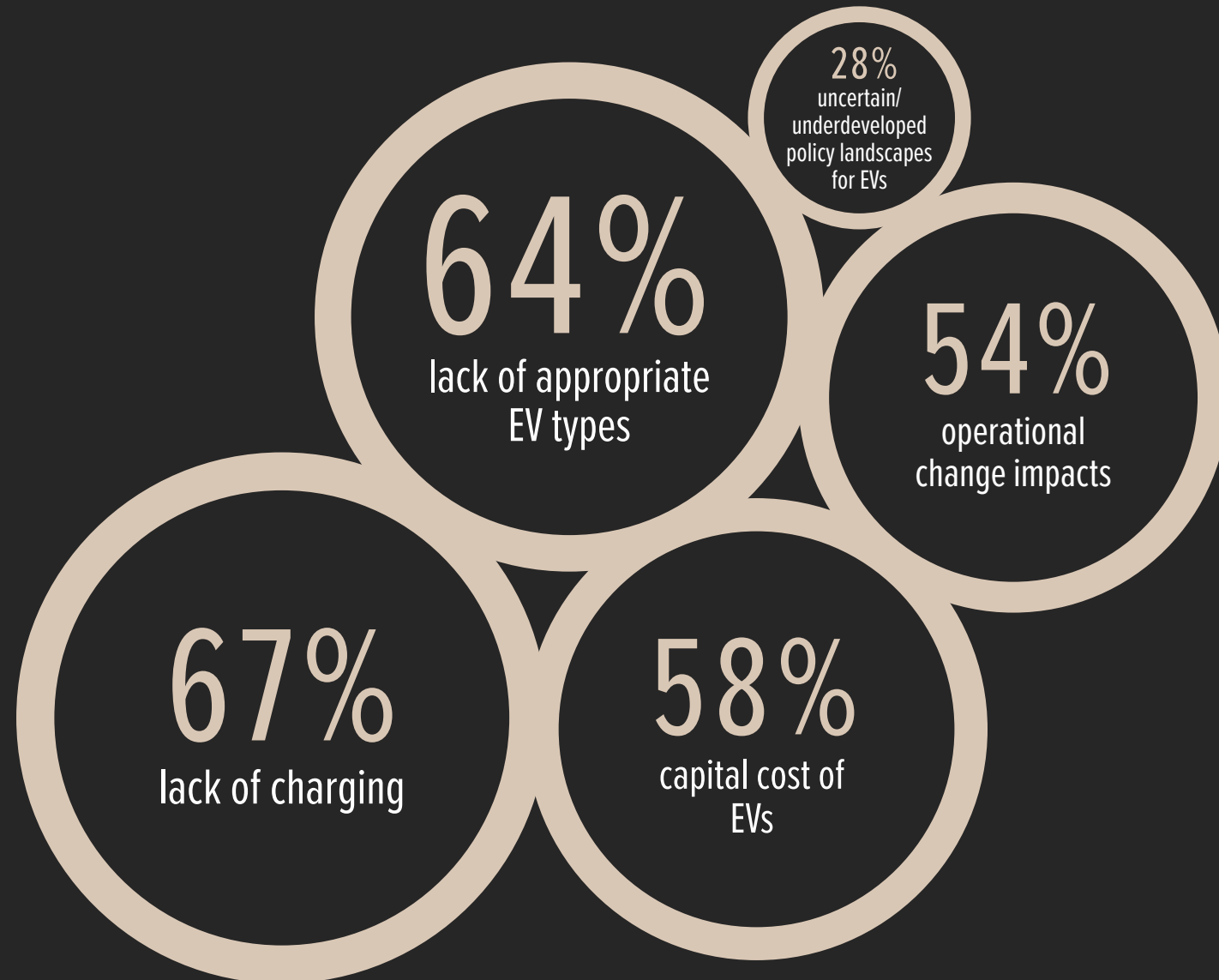


BARRIERS TO THE EV TRANSITION

TOP 5 BARRIERS TO EV ADOPTION REPORTED BY EV100 MEMBER

Climate Group's EV100 initiative has many Fortune 500 members signatories who support more favourable EV procurement tax benefits, supportive policies at state, regional and city government levels, and government targets to phase out petrol and diesel vehicles

Figure 15 [ref. 14].



CRITICAL MINERALS

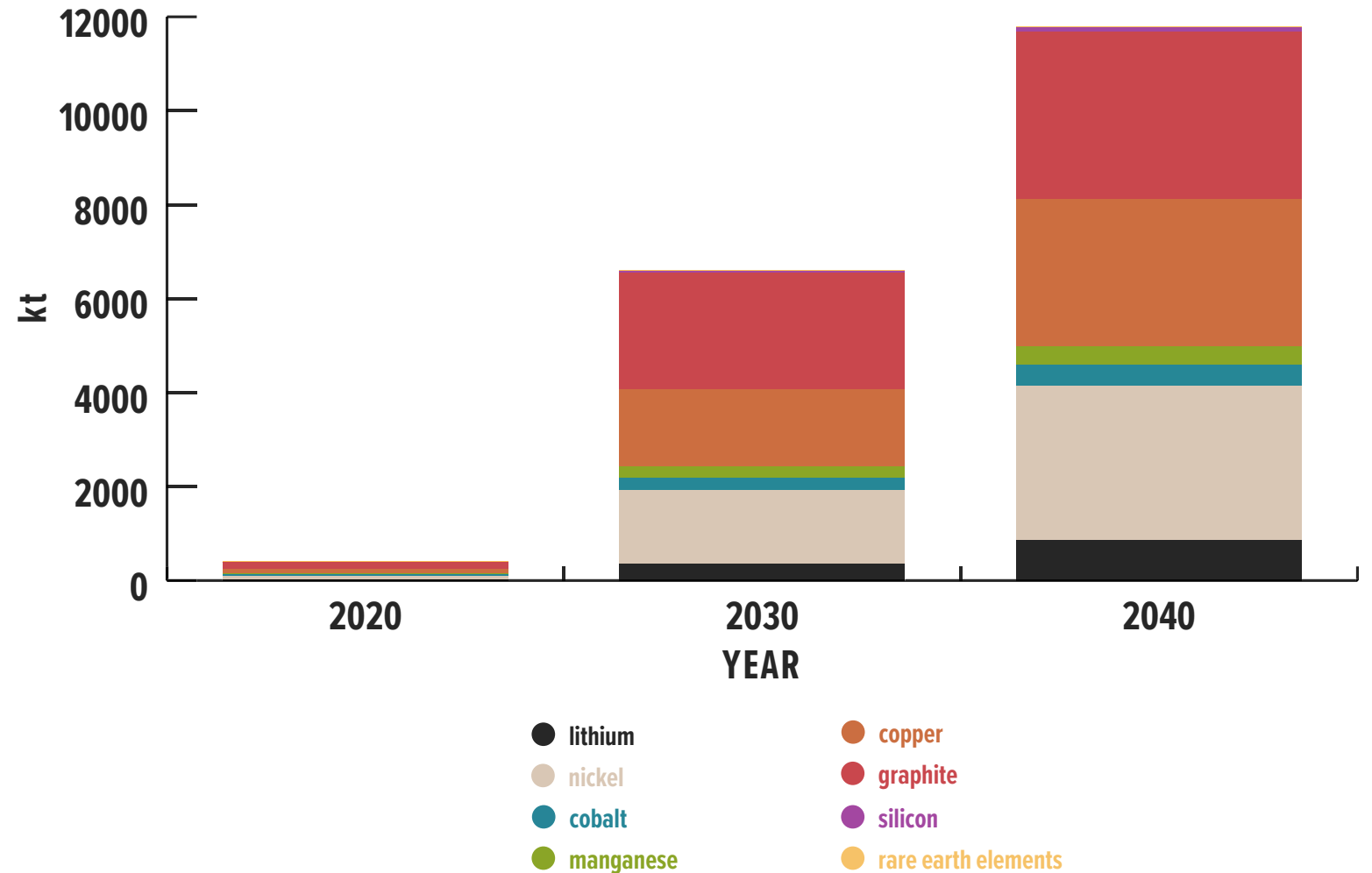
Under the IEA's Sustainable Development Scenario, which decibels a pathway fully compliant with the Paris Agreement, the need for critical earth elements found in EVs such as lithium and cobalt are predicted to increase to 2040 where as the supply stays the same and recycling abilities continue to lag behind the need for innovation.

The United States, for example, needs ten times the amount of rare earth metals it currently has to meet President Biden's ambitious 2030 EV goals.

total mineral demand (kt) from new EV sales by SDS

2020-2040

Figure 16 [ref. 15].



infrastructure needs are lagging within the EV transition

- In 2021 there were over 200,000 public chargers in Europe, compared to 111,477 public chargers in the U.S.
- The American Jobs Plan, aims to build a national public charging network of 500,000 EVSE ports by 2030
 - As of September 2021, the United States has installed 20.2% of total projected EV Supply Equipment ports
 - To meet this goal by 2030, approximately 11,407 public EVSE ports will need to be installed each quarter for the next 9 years

proper growth means widespread accessibility

- The majority (56.7%) of public fast electric vehicle supply equipment (EVSE) ports are on the Tesla network and are therefore only readily accessible to Tesla drivers
- Combating monopolization within EV growth through policy is important
 - For example, the right-to-repair measure in Massachusetts ensures independent repair shops have access to the same diagnostic tools as manufacturer run repair shops

HYDROGEN VS. ELECTRIC

WHAT WILL WIN OUT?

A hydrogen-powered vehicle is classed as a Fuel Cell Vehicle (FCV). Hydrogen gas is fed at high pressure to a fuel cell where electricity is produced to power the motor, with water and heat by-products. This compares to a Battery Electric Vehicle (BEV or EV) which is powered by electric motors that pull current from a rechargeable battery.



11 THOUSAND
HYDROGEN FUEL CELL VEHICLES
IN THE US IN 2021



1.7 MILLION
ELECTRIC VEHICLES
IN THE US IN 2021

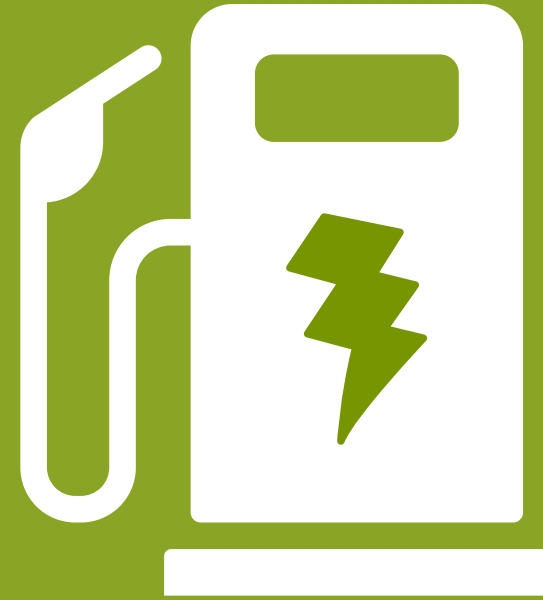


HYDROGEN

As of 2021, hydrogen use in the transportation sector has been limited to less than 0.01% of energy consumed.

The *CE efficiency rating of hydrogen batteries is ~60% as hydrogen requires nearly as much energy to produce as it delivers.

Today 95% of the hydrogen produced in the United States is made by natural gas reforming in large central plants. Very little hydrogen comes from renewable resources because electrolyzing water to separate hydrogen atoms from oxygen is hugely energy intensive.



ELECTRIC

Lithium-ion batteries have a CE efficiency rating of ~99% as they can maintain high voltage output at a lower state of charge throughout a shift.

Electric vehicles are projected to take over the vehicle market and Battery electric vehicles (BEVs) accounted for $\frac{2}{3}$ of new electric car registrations and $\frac{2}{3}$ of the stock in 2020.

EV TRANSITION AND STATE TAX POLICIES

- Drivers help maintain the national highway through gas tax, a revenue that is declining based on many aspects including the EV transition.
- 30 states have laws requiring a special registration fee for plug-in electric vehicles. Of those, 14 states also assess a fee on plug-in hybrid vehicles. These fees are typically in addition to traditional motor vehicle registration fees.
- Alabama, Arkansas, Ohio and Wyoming all enacted bills in 2019, setting fees for electric vehicles to \$200 annually.
- See bulletin No. 20220303 for more information about tax policy.

POLICY NEEDS

In order to help the EV transition continue to develop seamlessly across all sectors and governments there are many aspects of policy and industry that must change.

GREATER REGULATION FROM GOVERNMENTS

Increased climate mandates will push EVE engagement and innovation

CONTINUED TRANSITION TO EV MANUFACTURING FROM MAJOR VEHICLE MANUFACTURERS

Major names phasing out internal combustion engine vehicles will guide the market to invest in EVs

ENSURING COMPANIES HOLD THEMSELVES ACCOUNTABLE TO CLIMATE AND CARBON COMMITMENTS IN ORDER TO ENFORCE THE DEPLOYMENT OF MORE EV FLEETS AND EVSE

Avoiding greenwashing, enforcing consistent reporting

MORE GOVERNMENTAL EVSE PLANNING TO DEVELOP GREATER CONNECTIVITY ACROSS ALL EV NETWORKS

Manufacturing vehicles only beneficial when it can be supporting by a substantial charging network

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MISSION STATEMENT

Provide support to public and private organizations on the risks, unintended consequences, and opportunities of the global sustainability transition

PRIMARY TRANSITION AREAS OF FOCUS

Technology Transitions – Energy Transitions – Biobased
Transitions Economy

COMPONENTS OF THE TRANSITION

Supply Chains – Green Finance – Critical Minerals – ESG –
National Security

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dynamicslab.org

IF YOU WOULD LIKE TO LEARN MORE, VISIT [DYNAMICSLAB.ORG](https://www.dynamicslab.org) WHERE YOU WILL FIND



SUSTAINABLE FUELS & THE AVIATION SECTOR

BULLETIN NO. 20220101

The transition to Sustainable Aviation Fuels (SAF) has the potential to significantly benefit both the domestic economy and environment. SAF can reduce the risks of the Electric Vehicle Transition which is expected to have significant implications for the production and demand of sustainable/renewable fuels such as Ethanol or renewable diesel.

<https://www.dynamicslab.org/sustainable-aviation-fuels-technical-bul>



CRITICAL MINERALS & THE EV TRANSITION

BULLETIN NO. 20220102

The production of a typical lithium-ion battery requires five minerals dubbed “critical minerals” by the USGS - lithium, cobalt, manganese, nickel, and graphite. These critical minerals each face potentially significant supply chain bottlenecks and disruptions, such as: inadequate supply, dominance by select countries in production and refining, an oligopoly of producers, and more. Additionally, the extraction of critical minerals includes environmental and socio-political impacts that must be addressed for a sustainable and just EV transition.

<https://www.dynamicslab.org/critical-minerals-ev>

REFERENCES

1. <https://www.statista.com/statistics/1185535/transport-carbon-dioxide-emissions-breakdown/>
2. <https://www.statista.com/statistics/1084166/ghg-emissions-transportation-sector-globally-by-country/>
3. <https://evadoption.com/ev-sales/ev-sales-forecasts/#:~:text=Below%20is%20our%20latest%20long,more%20than%20500%2C000%20in%202021.>
4. <https://www.iea.org/reports/electric-vehicles>
5. <https://www.c2es.org/document/us-state-clean-vehicle-policies-and-incentives/>
6. <https://www.acea.auto/fact/overview-electric-vehicles-tax-benefits-purchase-incentives-european-union-2021/>
7. https://www.fhwa.dot.gov/bipartisan-infrastructure-law/evs_5year_nevi_funding_by_state.cfm
8. <https://www.ncsl.org/research/energy/state-electric-vehicle-incentives-state-chart.aspx>
9. <https://www.eafo.eu/alternative-fuels/electricity/charging-infra-stats>
10. <https://www.fleetforward.com/10135127/which-states-have-the-most-and-least-ev-chargers-per-capita>
11. <https://www.statista.com/statistics/416735/leading-us-states-for-electric-vehicle-charging-stations-and-outlets/>
12. https://www.eea.europa.eu/data-and-maps/daviz/new-electric-vehicles-in-eu#tab-chart_1
13. <https://www.visualcapitalist.com/climate-targets-of-fortune-500-companies/>
14. <https://www.theclimategroup.org/sites/default/files/2021-09/Key%20Policies%20to%20Drive%20the%20Electric%20Vehicle%20Transition%20-%20Updated.pdf>
15. <https://www.iea.org/data-and-statistics/charts/total-mineral-demand-from-new-ev-sales-by-scenario-2020-2040>

REFERENCES

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