# State of US Autotech and Opportunities for Swedish Companies

## Autotech Report 2024

May 2024
Business Sweden USA

BUSINESS SWEDEN
THE SWEDISH TRADE & INVEST COUNCIL

# SCOPE OF REPORT

# This report will focus on technologies for autonomous driving and connectivity – two of the main areas transforming the future of the automotive industry

**Four key emerging areas within the mobility sector**

**Focus areas for this report**

| | AUTONOMOUS DRIVING | CONNECTIVITY | ELECTRIFICATION | SHARED MOBILITY |
|---|---|---|---|---|
| **WHAT?** | • Technologies enabling vehicles to sense their environment and operate without or with limited human involvement | • Technologies for intelligent networking, constant data exchange and comprehensive digitalization of all road traffic | • Technologies and related infrastructure enabling EVs and optimization of batteries' lifetime | • Technologies for shared mobility or when vehicles are shared among individuals over time or together among multiple passengers |
| **HOW?** | • Applied AI<br>• ADAS<br>• Sensors and components | • Cloud and edge computing<br>• Advanced connectivity<br>• Data services | • EV batteries<br>• EV charging systems<br>• Battery optimization | • Innovative vehicle concepts<br>• Web3<br>• Micro mobility solutions |
| **MARKET SIZE*** (USD billion) | US AV car market revenue, 2024<br>**14** | Connected car market size North America, 2024<br>**30** | US electric mobility market, 2024<br>**35** | US shared mobility, 2024<br>**301** |
| **CAGR** | **+20%**<br>2024-2029 | **+25%**<br>2024-2029 | **+19%**<br>2024-2033 | **+1.7%**<br>2024-2028 |

**Note:** Numbers may differ from the 2023 US Autotech report due to source and market definition
**Source:** McKinsey & Co, Mordor Intelligence, Nova One Advisor, Statista

GLOBAL AUTOTECH MARKET OVERVIEW & TRENDS

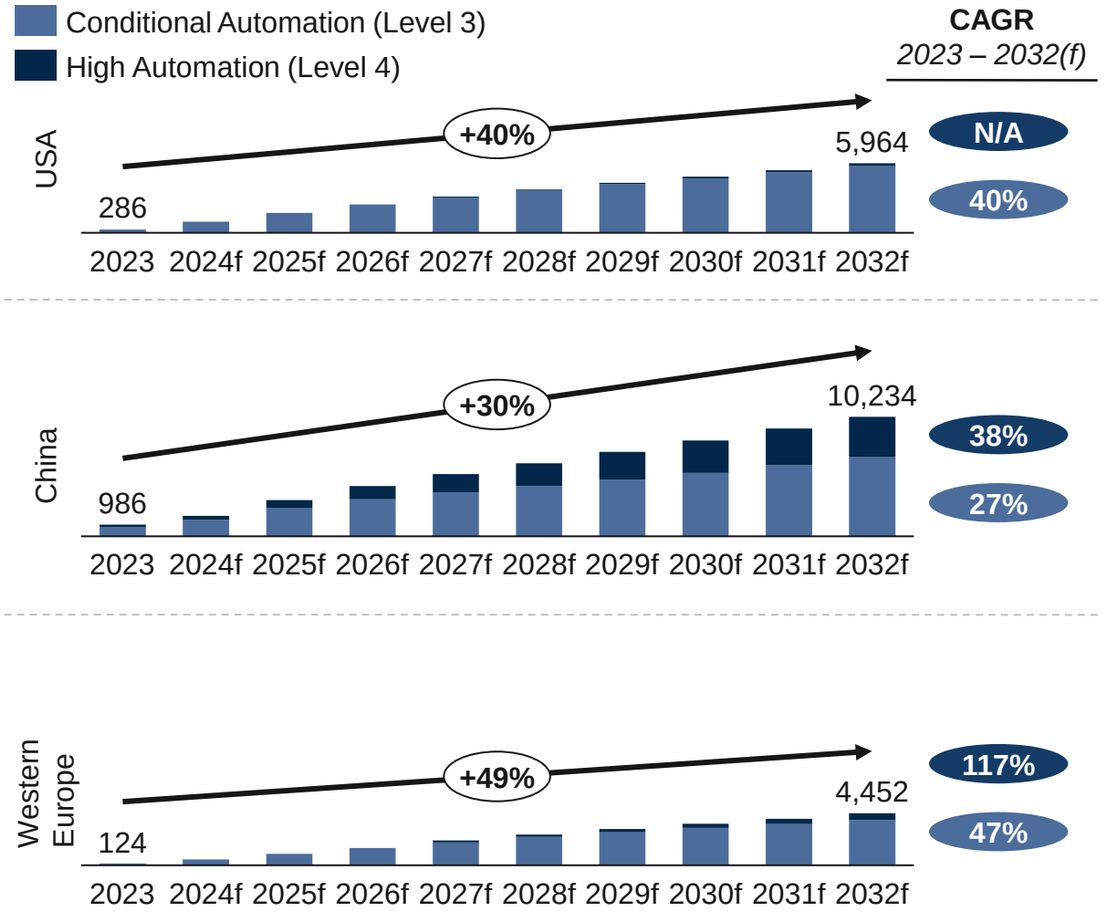
US AUTOTECH MARKET OVERVIEW & TRENDS

US AUTOTECH CLUSTERS & REGULATIONS

US ENGAGEMENT OPPORTUNITIES & STRATEGY

# Despite strong growth in Level 3 vehicles, the US is projected to lag other key regions on selling highly automated systems with China being the first mover

**Light Vehicle Sales by Autonomy Level* and Geography, 2023-2032(f)**
Vehicles sold, thousands




## Observations and trends

- **The US has traditionally been a leader in technology innovation and has a robust ecosystem for AV R&D, driven by a combination of established automakers, tech giants, startups and academic institutions**. American companies like Waymo, Tesla, Zoox and Aurora have been pioneers in developing and testing AV technology
  - Competition between the US and China has led the US self-driving industry to seek more federal regulatory support leadership to compete with Chinese firms after recent backlashes
- **The US will have the slowest sales development across level 4 (high automation) light vehicles** through 2032 despite strong overall growth
- A large increase in both Chinese Level 3 and Level 4 light vehicle sales during 2023 compared to the year before has established China as a significant first mover. By 2032 China is anticipated to emerge as the dominant market leader, with the combined sales of Level 3 and Level 4 light vehicles projected to surpass those of Western Europe by over double and exceed the US by 70%
- **China has already introduced level 4 highly automated vehicles to the market and is expected to dominate this segment** with roughly one third of the self driving light vehicle sales projected to be Level 4 by 2032
- **China has a sophisticated regulatory system and an AV strategy established in 2020 by the central government**, with a set of goals for 2025 and broad support from local governments, aiming for large scale vehicle production, extended network and connectivity coverage and national AV standards

**Note:** *Includes only autonomy levels considered “self driving” (level 3+); +); level 5 not included as sales in smaller numbers are not projected until 2031
**Source:** Euromonitor, McKinsey, PR Newswire, Mordor Intelligence, Reuters

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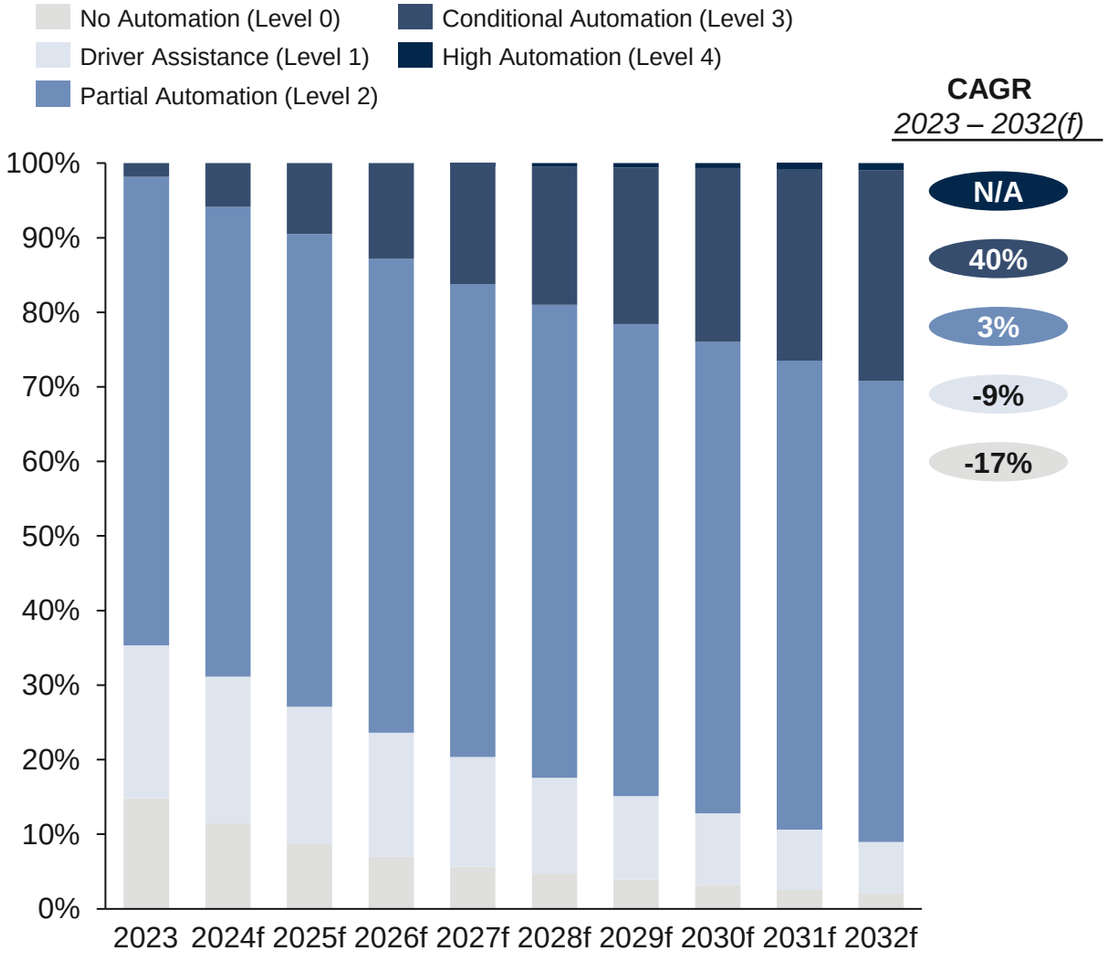
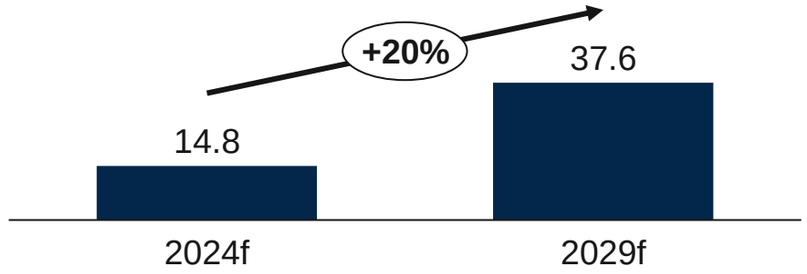
# The US AV market will more than double in size in the next 5 years driven by sales of level 3 systems, while large scale level 4 system adoption is still further away

**Composition of US light vehicle sales by autonomy level, 2023-2032(f)**
Percent




**US AV Car Market Revenue, 2024(f)-2029(f)**
USD billions



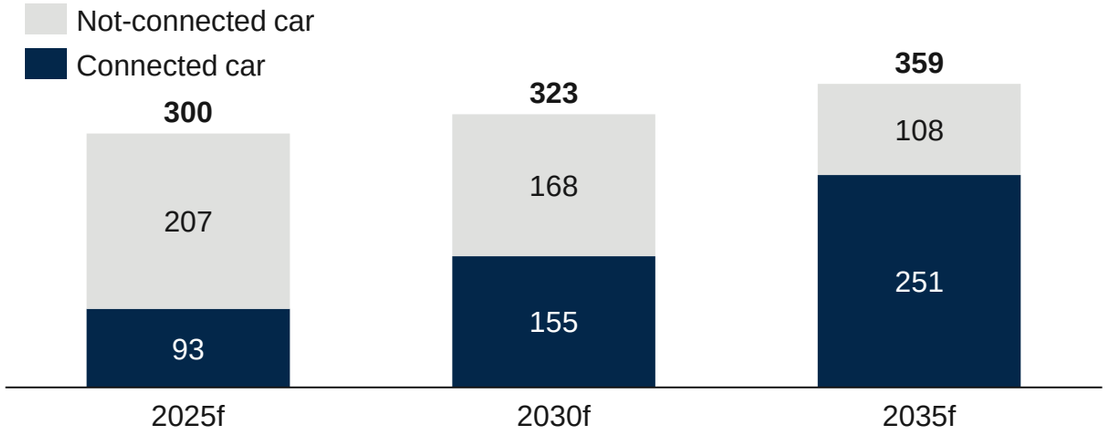

**Observations and trends**

- US AV market growth will be driven by sales of conditional automation systems (level 3), wherein automated tasks include braking, steering, and accelerating
- Influenced by federal tax incentives and prevalence of federal and state regulations and guidance, **the US light vehicle market transitions towards further adoption of ADAS solutions** and there are an increasing emphasis across OEMs to include these solutions, while large scale adoption of higher automation still have a long way to go
  - By 2025, over 70% of new vehicle sales in the US will include partial or conditional automation features
  - High automation AVs, level 4, will see an extended adoption timeline and is projected to only account for roughly 1% of total new light vehicle sales by 2032

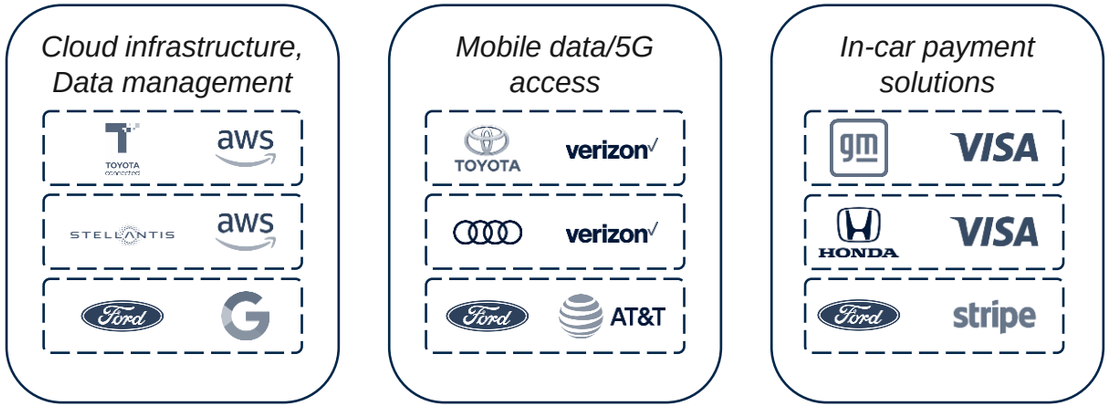
**Note:** Level 5 not included as sales in smaller numbers are not projected until 2031
**Source:** Euromonitor, JD Power, Mordor Intelligence, Morgan Lewis, McKinsey, CBInsights, Yahoo Finance

# Most cars driven in the US in 2035 will be connected; widespread adoption will be bolstered by a favorable regulatory environment and industry collaborations

**US Car Parc* by connectivity status, 2025(f)-2035(f)**
Millions




**Selected US OEM partnership examples**




**Note:** *Car parc refers to the total number of registered vehicles within a geographic region
**Source:** Ford, GM, BMW, Visa, Verizon, Amazon, Smart Cities Dive, Strategy &, CNBC, Forbes, Department of Transport

**Observations and trends**

- By the year 2035**, 70% of vehicles in use in the US are projected to be equipped with connectivity features**, a more conservative projection than previously estimated 90% of vehicles a year back
  - By 2030, more than 95% of new cars sold are likely to have embedded connectivity
  - Car companies can generate up to 1,600 USD per car in the future from connected car services, a significant increase from current yearly revenue streams of 120 USD per vehicle and year on average
- In April 2023, **the Federal Communications Commissions allowed several industry leaders to deploy cellular vehicle-to-everything (C-V2X) technology**, removing significant barriers to advancing connected transport
  - The Department of Transportation (DOT) released a draft “A Plan to Accelerate V2X Deployment” in 2023 setting C-V2X as a national priority, as of March 2024 it has received support from several senators urging the DOT to deploy connected vehicle Technology
  - DOT opens 40 MUSD grant opportunity for CV technologies that promote road safety, including V2X
- **US connected car market growth is enhanced by extensive collaboration between major OEMs and technology partners** in the areas of telecommunications, financial services, cloud infrastructure, data management, etc.

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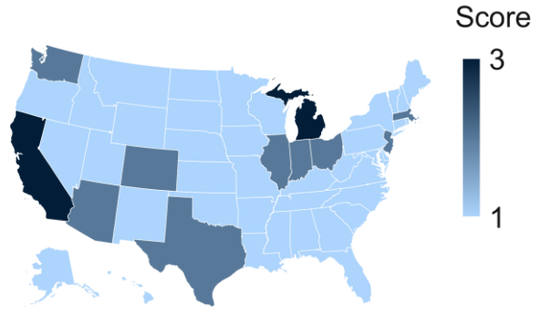
# Michigan and California are the leading states in terms of autonomous vehicle research, development, and deployment, as well as OEM R&D and Tier 1 presence

**Geographic Concentration of US Automotive Stakeholders and Autotech Research and Operations, 2022-2023**

## 1. OEM R&D

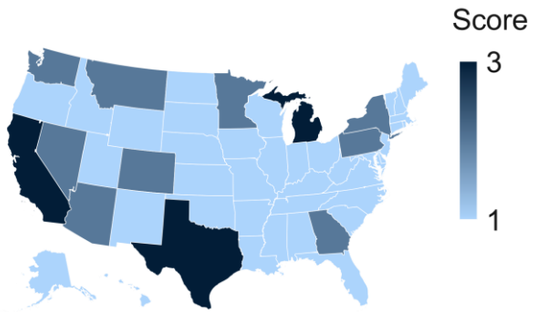
**Weighted Rank: 25%**




**Michigan and California are the key hotspots for OEM R&D**. R&D presence is also strong in the other Midwestern states, as well as Massachusetts, Texas, Washington, and New Jersey. Additionally, climate variation in Arizona and Colorado make these states particularly attractive for testing and development

## 2. AV R&D*

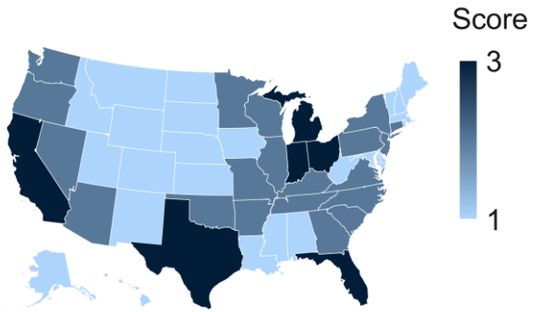
**Weighted Rank: 25%**




Driven by the abundance of AV companies operating in Silicon Valley, **California is the top state for AV R&D as of 2022**. Additional key R&D clusters are found in Michigan, Texas, and Arizona, while other states such as Georgia, New York, and Pennsylvania show promise for future industry development

## 3. TIER 1s

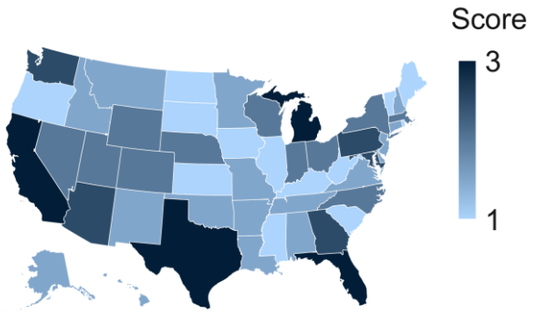
**Weighted Rank: 25%**




**California, Michigan and Texas** have the greatest number of automobile engine and parts manufacturing establishments in the US. There is also a notable concentration of parts manufacturers found in the midwestern and southeastern US, particularly in Ohio, Indiana, Florida, and North Carolina

## 4. AV & CV** Deployment

**Weighted Rank: 25%**



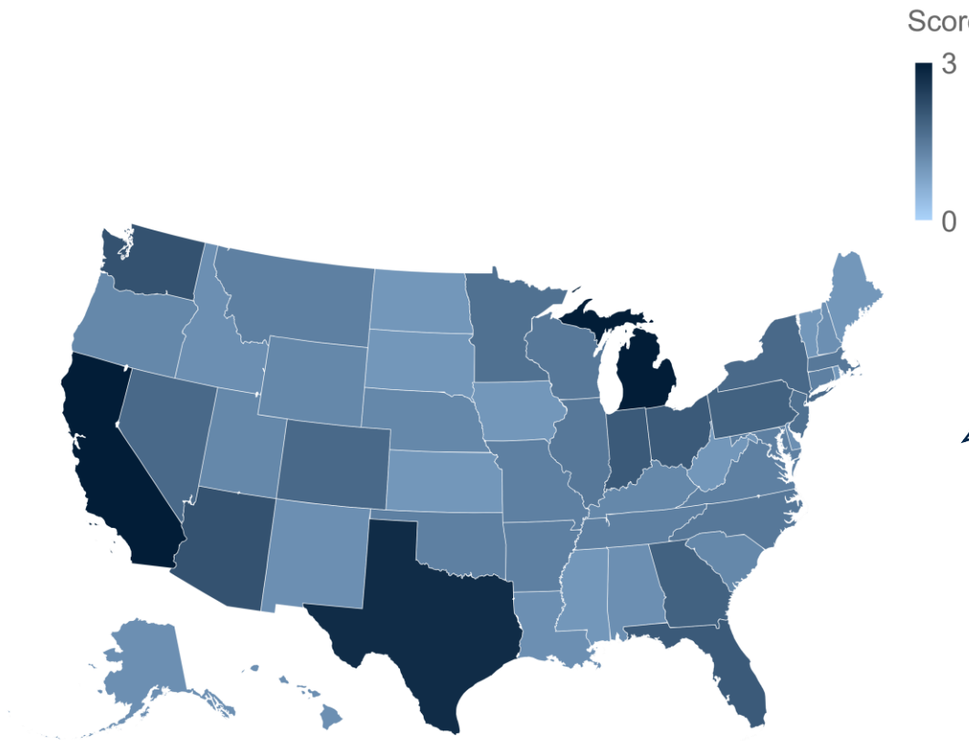

As of 2022, **California and Texas** lead the charge on AV deployment in the US, supported in part by permissive regulatory frameworks. On the other hand, **Florida and Michigan** lead on connected vehicle (CV) deployments. Additional states of interest include Pennsylvania, Washington, Maryland, and Georgia

**Note:** *Excluding OEM AV R&D **Connected Vehicle. Criteria 2 and 4 are updated as of 2022
**Source:** IBISWorld, Alliance for Automotive Innovation, Oliver Wyman, US Department of Transportation, Global Fleet, Business Sweden analysis

# Based on the weighted criteria, California, Michigan, and Texas present the most attractive opportunities for the US Autotech industry

**Comparison of Relevant Criteria Rankings by State, 2022-2023**
State score based on criteria weighted ranking*

**Key states**




**Top 10 States Based on Weighted Criteria**
Weighted score

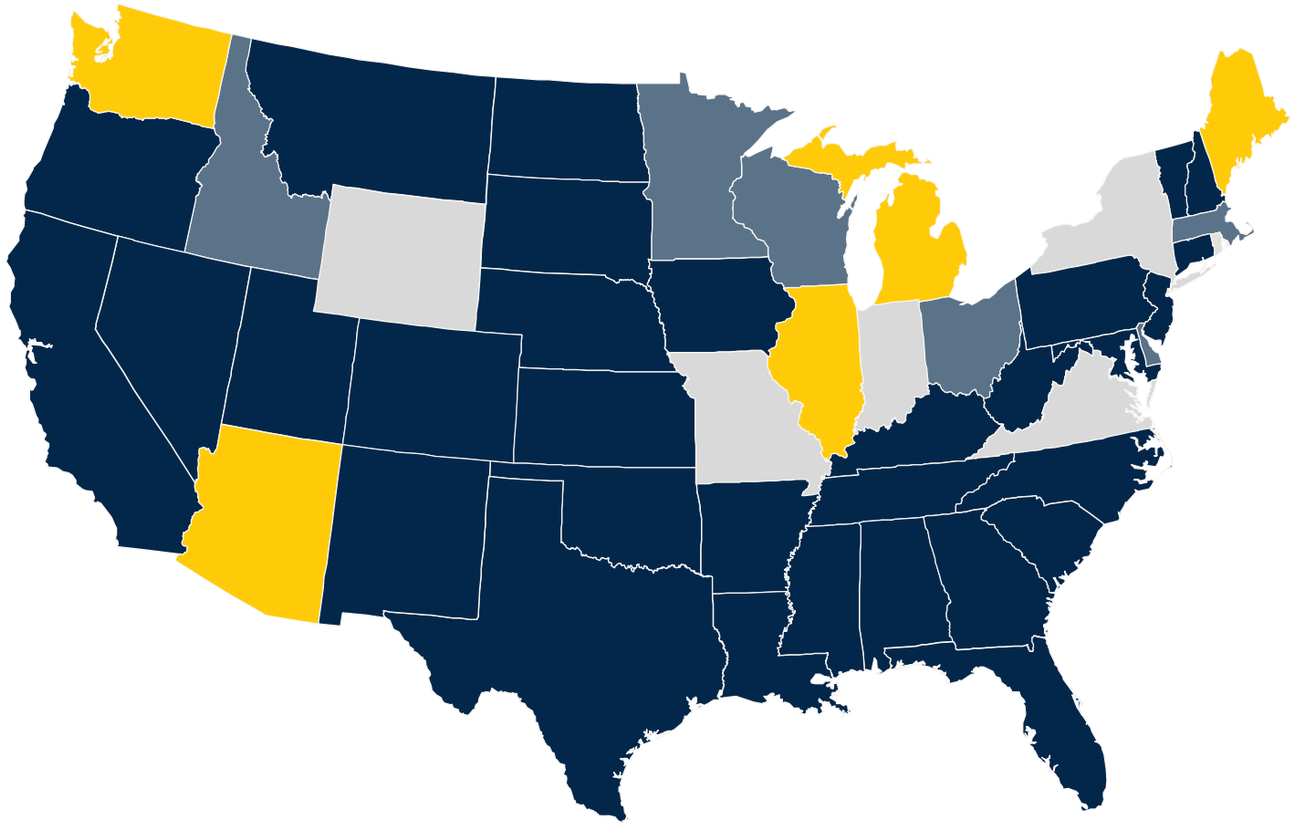
| State | Combined Score |
|---|---|
| California | 3.0 |
| Michigan | 3.0 |
| Texas | 2.8 |
| Arizona | 2.1 |
| Washington | 2.1 |
| Florida | 2.0 |
| Indiana | 2.0 |
| Ohio | 2.0 |
| Georgia | 1.9 |
| Pennsylvania | 1.9 |

**Note:** *Weighted criteria used for state ranking include the number of OEM with in-state R&D (25%), AV R&D facilities (25%), Tier 1 suppliers (25%), and AV & Connected Vehicle deployments (25%)
**Source:** IBISWorld, Alliance for Automotive Innovation, US Department of Transportation, Business Sweden analysis

# State governments are responsible for regulating AV operations on public roads; most states have enacted legislation providing guidelines for AV deployment

## State AV Legislative Action (as of 2023)

= Enacted legislation
= Both
= Executive order
= None



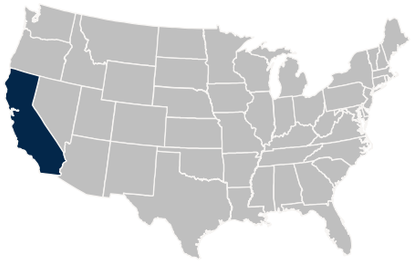
## Commentary and trends

- **The US federal government has opted to provide each state with regulatory power over AV operations**; however, the NHTSA* supports states with regulatory framework
- State AV requirements are constantly shifting and evolving, with 25 states and the District of Columbia considering new regulations in the first half of 2023 alone
- One major legal concern surrounding AV deployment is liability for accidents; current state regulations do not adequately address this issue
- **While many states in 2023 enacted or proposed laws to expand AV operations, pending laws in California and Texas seek to restrict AV deployment to some degree**, reflecting a backlash against the rapid AV implementation observed in the two states

**Note:** Enacted legislation means it is an approved law that has gone through the congressional process and received approval, while an executive order can be issued by a state governor and has the force of a law
**Source:** DOT, State Legislatures, NCLS, Center for Automotive Research * National Highway Traffic Safety Administration

# California, Texas and Michigan are the top states for AV development, though regulatory requirements in each state vary widely from one to the next

## CALIFORNIA



- California is the state with the most comprehensive laws governing AV testing and operations
- Permits are required to test or operate autonomous vehicles on public roads; different permits are available for testing with a safety driver, driverless testing, as well as deployment
- As of April 2024, 35 companies hold permits to test with a safety driver, 6 hold permits for driverless testing, and 3 are permitted to operate; there are restrictions regarding the locations, time of day, and road conditions in which permitted companies are allowed to operate

## TEXAS

- Texas passed a law in 2017 allowing AVs on state roads with no regulatory oversight whatsoever, provided that the vehicles comply with all traffic laws and are equipped with video recording devices
- AVs can be operated regardless of whether a licensed human operator is physically present in the vehicle as long as the AV complies with applicable federal rules
- Cities in Texas are prohibited by law from regulating autonomous vehicle operations
- The Texas Department of Transportation created a Connected and Autonomous Vehicle Task Force in 2019 to help coordinate and advance CAV technologies across the state

## MICHIGAN

- As of 2016, autonomous vehicles are legally allowed to operate on Michigan roads without restrictions; driverless operations are allowed under specific circumstances
- Michigan requires that manufacturers submit proof of vehicle insurance to the secretary of state before conducting AV testing, but fail to outline how insurance claims should be applied or the rights of individuals injured by AVs
- Regulations declare the legal operator of an AV to be the automated driving system itself, leaving it unclear who is liable if a crash occurs
- In 2021, Michigan Senate Bill 706 authorized the Michigan DOT to oversee the development and operation of automated vehicle roadways

**Source:** Texas Department of Transportation, California Department of Motor Vehicles, Michigan State Legislature, Ramsey Law Group, Bloomberg

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# To accelerate growth in the US, companies should strategically locate operations in key Autotech regions, leverage partners, and attend in-person events

## KEY TAKEAWAYS

**Consider focusing expansion efforts on key regions such as Michigan, California, or Texas where there are an abundance of target customers and strategic partners, as these players often prioritize proximity when selecting suppliers/collaborators**

**Collaborate with EDOs, incubators, and other partner organizations to expedite time to market and increase visibility to potential customers**

**Maximize interest from US investors by secure funding in Europe and establishing a presence on the US market before seeking US financing**

**Network in-person with US stakeholders at Autotech conferences and trade shows; building face-to-face connections will substantially raise the chances of generating new business**

It's important to keep in mind how many touchpoints you will need to even begin discussions with an organization. I've never heard of a startup talking to only one person and getting the greenlight for a project.

***Venture Investor, Bay Area Automotive-Focused VC***

There are several key things we keep in mind for partnerships. Firstly, we look toward the team – the founder, the company reputation, etc. We also look at the technology – is there an actual need for their product. Finally, we look at their existing traction – who are their existing partners, how long have they been around, what kind of funding they have, etc.

***Principal Innovation Manager, Top-Tier OEM***

**Source:** Business Sweden Analysis

# Potential for Swedish companies to take part in different projects and pilots facilitated by governmental agencies such as Vinnova, Future Mobility and GTI

| | VINNOVA Sweden's Innovation Agency | FUTURE MOBILITY | GTI |
|---|---|---|---|
| **WHAT?** | • Sweden's innovation agency plays a crucial role in the Autotech space by offering financial grants and funding programs designed to stimulate R&D<br>• Vinnova facilitates collaborations between companies, research institutions, and public sector organizations to drive technological advancements and innovation | • Aim to increase collaborations between actors in Sweden and the US to promote sustainable mobility and strengthen the countries' respective innovation systems<br>• Future Mobility can support you by matchmaking and funding new bilateral collaborations and welcomes proposals encompassing innovation collaborations within sustainable mobility | • A joint initiative between four Swedish government agencies, promoting Sweden-US green transition collaboration<br>• Engage with Swedish and American stakeholders – incl. cities, companies, and academia – through system pilots to provide an opportunity to showcase solutions for green transition |
| **CRITERIA** | • Vinnova favors projects that are innovative, collaborative, feasible, high impact, and have clear plans for commercialization | • To apply for innovation funding you have to be at least two actors, one in Sweden and one in the United States. | • Differs between various pilots/project – but in general focusing on Swedish actors ready to engage in projects in the US |
| **HOW?** | • Visit the Vinnova website to explore calls for proposals and funding opportunities that match your project's focus | • Vinnova handles the application process, read more and **apply** on the website | • Visit GTI's website and follow GTI on LinkedIn for ongoing updates on opportunities |
| **WEB PAGE** | https://www.vinnova.se/en | https://futuremobility.lindholmen.se/ | https://gti-sweden.se/<br>https://www.linkedin.com/company/sweden-us-green-transition-initiative/ |

**Source**: Business Sweden interviews, Business Sweden Analysis, Organizations webpage


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