



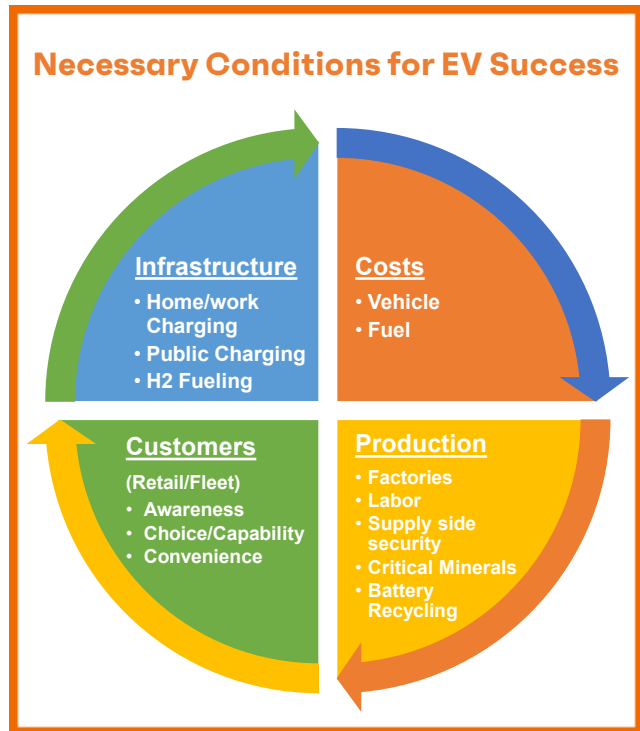
THE FUTURE IS ELECTRIC: LET'S DRIVE THERE TOGETHER

Automakers are planning to invest \$330 billion in electrification by 2025, and IHS Markit predicts there will be 130 electric vehicle (EV) (EVs include fuel cell, battery, and plug-in hybrid electric vehicles (FOEV, BEV, and PHEV, respectively) models available in the U.S. by 2026.

Yet today, of the 278 million light-duty vehicles registered in the U.S., only 1.5 million are electric. Although consumer interest continues to grow, and more than 50 EV models were for sale last year, EVs only made up roughly 2% of new vehicle sales – or approximately 300,000 vehicles out of the 14.5 million vehicles sold in 2020.

So, while the vehicles are coming, there's a lot more to do to encourage customers to buy electric and to prepare the market for ever greater numbers of EVs. Here are the programs and policies states can start putting in place today to achieve a zero-emission transportation future:

- Lead by example. Prioritize EVs for state fleet purchases
- Expand EV refueling infrastructure: charging and hydrogen refueling stations
- Sustain well-funded state-level point-of-sale EV incentives
- Update building codes for new construction and retrofits to require EV-ready charging
- Ensure the low-moderate income (LMI) community has access to EVs and charging infrastructure
- Assess the resiliency of state's electric grid
- Prioritize affordable electricity rates for recharging EVs
- Implement a low carbon fuel standard (LCFS)
- Initiate or participate in a consumer awareness campaign





State and Local Fleets can Lead the Way.

State and local governments can lead by example by prioritizing EVs (e.g., PHEVs, BEVs, and FCEVs) when making fleet purchases. This is truly an example of executive leadership and will serve to bolster consumer interest in an EV purchase. We recommend an immediate Executive Order for state fleet purchases followed by legislation with state and local government fleet requirements that provide a path to 100% ZEV fleet inventory by 2035.

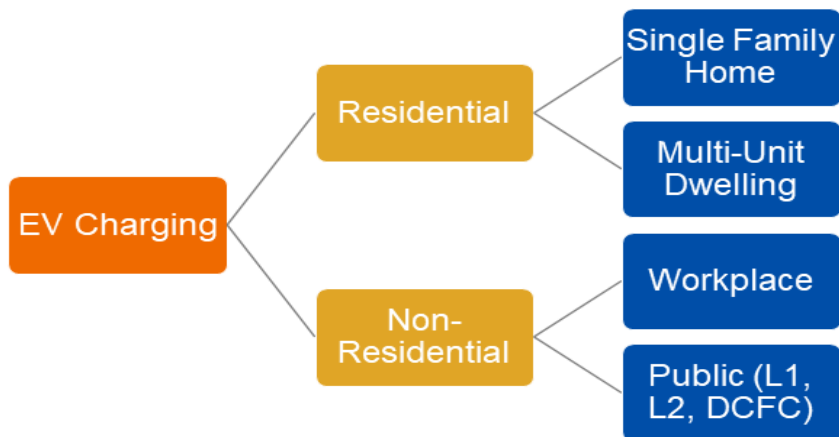
Charging and Hydrogen Refueling Infrastructure.

Hydrogen:

From a customer perspective, hydrogen refueling is nearly identical to gasoline refueling. A 5- to 10-minute fueling event provides 300-500 miles of range for most FCEVs. The issue today is the dearth of hydrogen fuel stations. Federal, state, and local governments must commit to hydrogen infrastructure – streamlining permitting, installing stations, and providing incentives that allow stations to come online to support vehicle sales. Hydrogen fueling requires careful coordination, since automakers cannot sell FCEVs without the stations, which is currently the case in 49 states. Yet stations need sales to justify construction and operation. Even in California, sales have been restricted due to a slower than expected roll-out of hydrogen refueling stations. States should also address long-standing barriers, like bridge and tunnel restrictions, that unnecessarily limit FCEV usage in the state.

EV Charging:

There are two types of EV charging structures: residential and non-residential.



Residential Charging:

Residential charging is essential to reaching future EV goals. According to the U.S. Department of Energy, roughly 80% of EV charging occurs at home.¹ Consequently, it should be required that 100% of parking spots at residential dwellings have charging, and we should immediately begin the transition – starting with building codes that require this for both new construction and renovations. Residential parking must provide, at a minimum, low-power Level 2 (LPL2) charging and preferably standard L2 charging. Standard L2 charging provides about 7 to 10 kW of electricity, which will supply about 20-40 miles of range per hour of charging. LPL2 provides 3.3-3.8 kW of electricity capable of supplying 10-15 miles per hour of charging.

¹ See: <https://www.energy.gov/eere/electricvehicles/charging-home>.



Finally, residents of single-family homes and multi-unit dwellings (MUDs) should enjoy the same access to charging. Nonetheless, because of the complexity and cost of installing EV charging at MUDs, some suggest that while residents in single family homes can charge at home, MUD residents should be forced to charge elsewhere, such as at DC fast charge stations or public chargers. We disagree. Charging at home is far cheaper, far more convenient, and far more reliable. It would be unreasonable to expect MUD residents to pay two or three times as much for charging and spend hours away from home each week just to charge their vehicles. This will lead them away. State-based and PUC programs, including grants, loans, and incentives, that encourage solutions for MUD charging should be implemented.

Non-Residential Charging:

Workplace

Workplace charging is second only to residential charging in importance. Like residential charging, workplaces have long dwell times (eight to ten hours, typically). Providing charging stations at work extends the range of BEVs for commuting, relieves range anxiety, and maximizes the electric miles driven in PHEVs. Moreover, workplace charging stations increase consumer awareness. The overwhelming majority of EV drivers have a positive experience and happily share this positive experience with co-workers.

As noted above, we recognize that most drivers will get sufficient charge at home if they have home charging. Consequently, unlike residential parking, not every workplace parking spot needs charging. Auto Innovators recommends the installation of LPL2 EV charging in 20% to 40% of employee parking spots. The state should commit to a plan to ensure this level of charging at workplaces.

Public

Public charging includes Level 1 (L1), LPL2, standard L2, and direct current fast charging (typically 50-350 kW). In addition to relieving perceived “range anxiety,” public charging stations also raise consumer awareness. There are far too many unique situations for specific recommendations, but some areas to consider:

- Highway corridors clearly require high-power DCFC (350kw) to allow drivers to quickly recharge on long-distance trips.
- Likewise, transportation hubs (airports, train stations, etc.) should have high-power DCFC (350kw) for transportation network company (TNC), taxicab, and other rideshare drivers to quickly recharge.
- City centers should also have DCFC at appropriate power levels depending on expected dwell time.
- Other public charging will depend on and should be analyzed for the expected dwell time and likely distance driven. For example,
 - Airport parking (beyond ride-share drivers noted above) will have dwell times measured in days, and drivers that do not typically travel long distances.
 - Amusement parks will have 6 to 12-hour dwell times with long-distance visitors.

- Convenience store or grocery store customers have short dwell times and local customers.
- Professional sports and concert venues will have 2- to 4-hour dwell times from medium-distance visitors.

A well-thought-out plan properly executed is essential to raising consumer awareness. It also ensures that public charging is readily available and that driving an EV is as convenient as driving today's gasoline vehicles.

Residential and Commercial Building Codes - Retrofit and New Construction Updates

Needed. According to the U.S. Department of Energy, roughly 80% of EV charging occurs at home, making access to home charging a top priority for customers considering an EV. Lack of access to home charging is a major barrier to EV adoption. As a first, and most cost-effective step states should immediately begin adopting residential building codes to require EV-ready charging capabilities in 100% of parking spots in new MUDs and single-family homes.

States should also begin adopting non-residential building codes that require installation of EV-ready charging capabilities in a significant portion of all new parking at workplaces and at public parking. Numerous studies have shown retrofitting residential and non-residential parking is five to six times more expensive than installing it during new construction. Moreover, the building codes should also include requirements to install the same infrastructure during any significant renovations, such as parking lot paving, electrical panel upgrades, etc.

While building codes that address new construction is a common-sense and lowest cost first step, it is not nearly enough to support the goals. For example, residential new construction typically accounts for about 1% of all residential units each year. Thus, new building codes would only provide residential charging in about 15% of the residential units in 2036. Consequently, the state must adopt public and private programs to support retrofitting of existing homes and MUDs, such as apartments, condos, and townhouses. As noted, these retrofits are far more expensive, but they must be completed to meet the goals.

Special attention should be given to the infrastructure needs in under-served communities to ensure that access to affordable and convenient charging and refueling options are made available on an equally aggressive timeline. However, MUD residents often face the most costly and burdensome obstacles to installing residential EV charging. For MUD residents, the additional costs to upgrade the electrical panel, install conduit between the electrical panel and their parking space, and the logistical challenges of securing building owner approval, coordinating the billing with the building owner, and persuading an owner to make a long-term investment on a rental property, make it near impossible to be an EV driver in a MUD.



Grid Resiliency/Utility Rate Setting Alignment.

A thorough review of your state's electric grid to determine the viability of expanded access in both the near and long-term makes strong practical sense. Public confidence in the resiliency of the grid will only help spur faster EV adoption. Failure to provide consistent service, particularly when the majority of EV charging is done at home, could be devastating for increased EV adoption, both for the light- and heavy-duty vehicle sectors.

Included in that review, a state commitment to transparent dialogue with the utility commission and energy companies about making home and public charging affordable and convenient.

Sustained Consumer ZEV Purchase Incentive.

Purchase incentives can be a persuasive and effective way to address vehicle affordability and interest customers in purchasing an EV. Coupled with federal incentives, state-based incentives continue to play an important and necessary role in EV adoption.

EVs continue to cost substantially more than a comparable gasoline-fueled vehicle, and so the compounded effect of the federal and state incentives are necessary to equalize purchase costs. Additional rebates provided for low- and moderate-income communities are also being used in numerous states to reduce the costs of purchasing an EV.

Establishment of a Low Carbon Fuel Standard.

A low carbon fuel standard (LCFS) not only supports EVs but can also further reduce emissions from every vehicle already on the road. In the context of climate change, market-based mechanisms are widely understood to encourage emissions reductions in the most efficient way, especially when broadly applied. Properly structured, a LCFS reduces the carbon intensity (CI) of gasoline and diesel fuel either directly or by funding low CI alternatives, such as PHEVs, BEVs, and FCEVs and the required infrastructure to support the use of these vehicles.

A LCFS can also provide a source of revenue for transportation-related investments and improvements. For example, Auto Innovators worked closely with the California Air Resources Board, utilities, and a broad stakeholder group to develop California's first point-of-purchase, statewide Clean Fuel Reward program, which utilizes revenue generated by the LCFS to create a sustainable, long-term funding source for consumer purchase incentives. Similarly, California's LCFS revenues are also being used to support fast-charging stations and hydrogen refueling stations.

Consumer Awareness Programs.

Consumer awareness, understanding, and trust of the technology is essential as we move from far below 2% national EV sales to 100% EV sales in the next 14 years. Raising this awareness can happen in many ways, and we encourage the state to explore a variety of options.