This document has been prepared as part of the implementation project of Legal Pathways to Deep Decarbonization (Michael B. Gerrard and John C. Dernbach, eds. Environmental Law Institute [2019]) (LPDD). For background information on the project, see https://lpdd.org

Memorandum to Accompany Model EV Ready Building Code Legislation

Electrical Vehicles ("EVs") are an efficient alternative to conventional internal combustion engine ("ICE") vehicles and can contribute significantly to the reduction of air pollution and greenhouse gas emissions. Hundreds of millions of EVs will have to be deployed in the next few decades in order to achieve an 80 percent reduction in greenhouse gas emissions from 1990 levels by 2050.[1] The goal is to shift 80% - 95% of the miles driven from gasoline to lower carbon energy sources like electricity and hydrogen.[2]

However, a massive effort will be required to provide the charging infrastructure necessary to service such vehicles. There were 276,100,000 vehicles registered in the U.S. in 2018.[3] So it stands to reason that every garage or parking structure, be it residential, commercial, or industrial, being built or significantly altered should be designed and constructed so that a substantial percentage of parking spaces are EV charging ready. This is especially so because buildings and parking structures constructed today will still be in place in 30 years. There is currently a scarcity of EV charging stations as well as a public perception that underestimates the availability of existing charging options. Studies generally suggest that people do not believe there are enough public charging stations for them to seriously consider getting a plug-in EV.[4] For example, one study showed that "[a]lmost 80% of people surveyed are unaware of any public charging station near them."[5]

The average person commutes 26-32 miles per day.[6] While some studies show that 80% of current electric vehicle charging is done at home,[7] for those living in apartments or condominiums without charging access, public commercial chargers are equally important.[8] Approximately 40% of the U.S. population lives in apartments or condominiums.[9] Home chargers will likely always be the primary charging location.[10] Most vehicles are parked more than 95% of the time, either at home or work.[11]

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1 Amy L. Stein and Joshua P. Fershee, Legal Pathways to Deep Decarbonization in the United States, p. 353

2 Id. p. 354

3 https://hedgescompany.com

4 *See*, 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, Final Rule, 77 Fed. Reg. 62624, 62627 (Oct 15, 2002), *available at* https://www.gpo.gov/fdsys/pkg/FR-2012-10-15/pdf/2012-21972.pdf

5 Amy L. Stein and Joshua P. Fershee, Legal Pathways to Deep Decarbonization in the United States, p. 362

6 AAA, Americans Spend an Average 17,600 Minutes Driving Each Year, https://www.newsroom.aaa.com/2016/09/Americans-Spend-Average-17600-Minutes-Driving-Year/.

7 Accelerating Investment in Electric Vehicle Charging, Ceres, March 2018.

8 Amy L. Stein and Joshua P. Fershee, Legal Pathways to Deep Decarbonization in the United States, p. 362

9 Id. p. 368

10 Marin County Electric Vehicle Charging Station Siting Plan, Draft Report, November 2018, page 12.

11 Amy L. Stein and Joshua P. Fershee, Legal Pathways to Deep Decarbonization in the United States, p. 367

Overnight charging of an EV at home for 8 hours on a Level 1 charger may only replenish the vehicle for about 40 miles of driving range.[12] A Level 2 charger can improve charging times significantly, as it can charge a car in 4 to 6 hours.[13] Level 3 chargers can provide a 50% to 80% charge in 20 to 30 minutes.[14] If EV charging stations become commonplace, EVs will become much more attractive as people will be confident that they will be able to charge their EVs at home and/or at work.

It should be noted that EV-ready charging infrastructure is significantly less expensive to install during new construction than it is for a building retrofit. One study indicates that for a parking lot with 10 total spaces and two charging stations, the estimated EV infrastructure costs amount to $920 per charger during new construction, versus $3,710 per charger for a retrofit, largely because of trenching, demolition, and additional permitting costs[15]. Therefore, preparing for the electrification of the transportation sector now with building codes that plan for the growth of the EV market will save retrofit costs.

In light of the above discussion, municipalities should consider the adoption of an EV-ready building code requirement within their jurisdictions. The proposed ordinance would require new or significantly altered one- or two-family residential buildings to be equipped with the installation of Level 2 electric vehicle supply equipment in proximity to the garage or carport dedicated for resident parking.

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[12] For example, a Chevy Bolt gets about 4 miles of charge for every hour of Level 1 charge, suggesting a 8pm-6am charge would provide 40 miles. EnergySage, https://www.energysage.com/electric-vehicles/charging-your-ev/charging-chevy-bolt/.

[13] EVTown, Levels of Charging, http://www.evtown.org/about-ev-town/ev-charging/charging-levels.html (last visited Feb. 25, 2018)

[14] Amy L. Stein and Joshua P. Fershee, Legal Pathways to Deep Decarbonization in the United States, p. 362

[15] Plug-In Electric Vehicle Infrastructure Cost-Effectiveness Report for San Francisco, November 17, 2016, http://evchargingpros.com/wp-content/uploads/2017/04/City-of-SF-PEV-Infrastructure-Cost-Effectiveness-Report-2016.pdf