Betwixt and Between: Integrating Electric Vehicles With Other Climate Change Mitigation and Adaptation Measures

Aladdine Joroff

Published: August 28, 2018

Aladdine Joroff *is a staff attorney and lecturer at Harvard Law School's Emmett Environmental Law and Policy Clinic.*

Growing demand and funding for electric vehicles ("EVs") underscore the importance of EV policies that are consistent with climate change mitigation and adaptation goals. As examples, this article briefly notes potential tensions between EV policies and "net zero" building goals, flood-resilient building designs, and emergency response planning. Some concerns, such as meeting increasing demands for electricity with low-emitting and affordable sources, reflect challenges that are not unique to EVs, but the scale of EV deployment may necessitate faster integration of new technologies and increased flexibility in synergistic climate change-related requirements.

Drive for Electric Vehicles

Electrifying vehicles is a component of strategies to reduce emissions from the transmission sector—an area to which many states and municipalities are turning more attention, driven in part by greenhouse gas ("GHG") emission reduction targets and strategies for meeting National Ambient Air Quality Standards. For instance, (1) approximately 20 states have GHG emission reduction targets and over 60 cities are committed to meet the goals of the Paris Accord, (2) nine states committed, via a memorandum of understanding, to collectively have over 3 million zero-emission vehicles operating in their states by 2025, and (3) according to the North Carolina Clean Energy Center, there were over 200 state or utility EV policies proposed or pending in 2017.

Influx of funding, such as the $2 billion that Volkswagen must invest in charging infrastructure for and promotion of zero-emission vehicles, will further accelerate the shift to EVs, as will their increasing cost competitiveness. Morgan Stanley, for example, forecasts that EVs will achieve cost parity with traditional gasoline-fueled cars by 2025.

Putting aside questions as to the emissions-related mitigation value of EVs themselves (e.g., individual behavioral driving responses and fuel sources for local grids), the following are examples of climate change mitigation, adaptation, and resiliency initiatives that could be at odds with greater adoption of EVs.

Net Zero Buildings

The growing push to reduce GHG emissions from the building sector is sometimes reflected in "net zero" objectives, whose various definitions include striving for buildings that produce zero GHG emissions or consume no more energy than produced with on-site renewable energy. Municipalities such as Santa Monica are leading the way, requiring new single-family and other residential buildings to generate at least as much renewable energy on-site as they consume during a typical year starting in 2017. At a larger geographic scale, California aims to achieve net zero energy use in residential and commercial buildings by 2020 and 2030, respectively.

Even if charged at night when grid-level demand is lower, EVs will typically increase the energy load of an individual building. To the extent that buildings and building owners are required to reduce energy use, utilize only non-GHG emitting sources of energy, and/or offset GHG emissions, net zero requirements could be a deterrent to the added load of an EV. This could be a particular concern in properties, such as condominiums, where EV use of electricity from common areas could create an additional expense to meet net zero requirements, e.g., additional solar panels to offset the EV charging, that would be paid for by all residents but used by only those with EVs. Another potential unintended outcome is that, if net zero requirements apply primarily to new buildings, EV users might decide to charge their vehicles outside their residences, perhaps at offices or older structures whose electricity sources make less use of renewables.

These tensions may lessen as nontraditional electricity prices drop, homes are designed to produce more electricity than they use, and storage technologies improve so that, for instance, solar power generated during the day can be used for vehicle charging at night. In the interim, regulators could consider complete or partial carve-outs or other accounting mechanisms for EVs in net-zero building programs.

Flood-Resilient Building Designs

Concern about increased flooding is driving adaptation/resiliency measures to protect the operation of buildings and health of residents in flood-prone areas. Some of these wet flood-proofing design measures, like flood vents that let water flow through ground level parking structures, could create inundation conditions that harm or limit the use of EV infrastructure.

EV supply equipment must often be installed a minimum distance above floor or surface levels, e.g., 18 to 24 inches for indoor and outdoor infrastructure, respectively, and at a maximum height, e.g., four feet. (These requirements are from the National Electric Code, which has been adopted by many states.) Federal regulations require new construction and substantial improvements in flood-prone areas to "be constructed by methods and practices that minimize flood damages." 44 C.F.R. 60.3(a)(3). For EV infrastructure, this primarily means elevating and protecting system components. For instance, a Pacific Gas and Electric Company EV Infrastructure Installation Guide from 1999 provides that, "if a charging station is in a flood zone, all chargers must be installed above the base flood elevation or water proofed to include personnel protection so that it complies with codes for electrical equipment which may become submerged." Further advice in guidance documents ranges from avoiding installation of EV infrastructure in areas subject to flooding to locating components above design flood elevations, i.e., base flood elevations or higher.

However, in most jurisdictions flood zones are defined in accordance with Federal Emergency Management Act (FEMA) maps, which are based on historic records and do not account for projected impacts of climate change. Until such maps are updated, regulators may want to apply flood-proofing requirements for EV infrastructure to a broader geographic area, such as areas that have been or are projected to be subject to significant flood events, regardless of their FEMA status. Regulators should also consider providing guidance, if not requirements, on whether and how to locate EV facilities in building areas that are designed to accommodate, rather than block, water. Such measures could range from placing EV stations on higher floors in parking structures to installing a combination of suspended and retractable cables that reduce the risk of immersion in water but maintain accessibility.

Emergency Response Planning

If governmental entities increase purchases of EVs, such as buses, they should consider the effect on evacuation plans for natural disasters like flooding and hurricanes that require moving people out of an area. Particularly in the instance of longer evacuation routes or travel times that are slowed by traffic, planners should consider the travel capacity of vehicles that depend on charging infrastructure, the availability of such infrastructure and power to it, and the time to use it in an event of an emergency.

* * *

Tensions such as these do not create insurmountable obstacles, but integrating the evolution of EVs and associated infrastructure with other climate change mitigation and adaptation goals will benefit from integrated thinking that considers objectives across sectors and outcomes.