



Electric Vehicle Charging Station Strategy for Real Estate Implementation in the United States

About RCLCO

Our mission is to help our clients make strategic, effective, and enduring decisions about real estate. We proudly celebrate more than 50 years of providing the best minds in real estate with cutting-edge analytics, actionable advice, and the highest level of customer service.



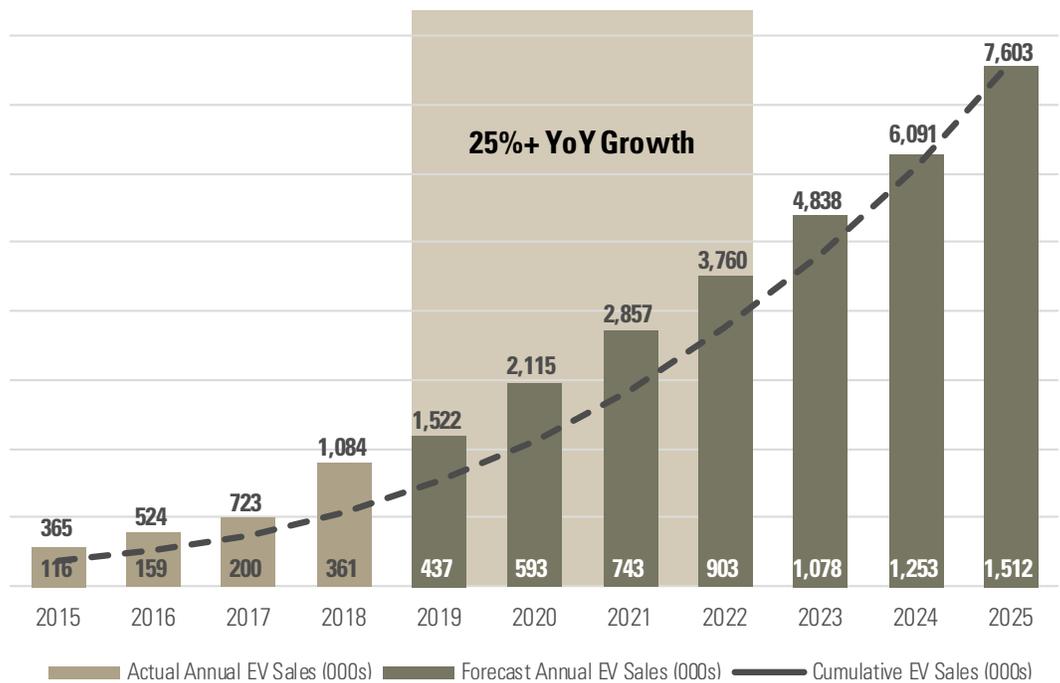
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Executive Summary

Rapid growth in electric vehicle (EV) sales requires significant new charging infrastructure: onus is on real estate owners to provide these new charging stations

Electric vehicle (EV) adoption is expected to grow at a rate of nearly 25% annually over the next five years. As a consequence, significantly more EV charging stations will be needed. Planning and introduction of the necessary infrastructure requires a concerted response from the real estate industry.

U.S. Plug-In Vehicle Sales



Source: InsideEVs; Navigant

Demand for EV charging is likely to shift, with a greater need for charging in multifamily, office, retail, and hospitality locations

The robust growth in EV sales necessitates that real estate owners install significant volumes of EV charging stations across all land uses and geographies. Specific trends underlying growth in EV charging (EVC), including the mass adoption of EVs, the diversification of EV drivers, and supportive regulations and incentives indicate that the relative distribution of charging stations among land uses will likely change as well. Multifamily, office, retail, and hospitality locations will see significantly more demand, while every land use will experience order-of-magnitude increases in overall charging station supply requirements.



Real estate owners who stay ahead of the curve by installing early can benefit from enhanced positioning opportunities, reduced costs, and new revenue streams

Many real estate owners already are, or should be, responding to this dramatic growth in EV sales by increasingly offering charging stations at their properties. Early adopters benefit from enhanced positioning opportunities and new revenue streams. Those who underestimate the impact of EV growth and delay offering EV charging may see reductions in asset positioning. As a result, owners who neglect to deploy EVC during construction if the opportunity is available will incur significantly higher installation costs post-development. In some markets the EV wave has already hit and properties that do not offer charging stations risk losing tenants, prestige, and positioning.

- » Within these affluent markets, and across several others, there remains a strong opportunity to utilize charging stations as a means to achieve premium positioning and differentiate an asset in a crowded field.

In all instances, real estate owners and developers who install EV charging stations early will benefit from capital cost reductions due to myriad government and utility incentives. Both offer prospects for significantly lower costs of planning and designing EVC infrastructure during development rather than retrofitting post-delivery. Effectively navigating these incentives and rebates, and designing buildings to accommodate EV charging infrastructure, allows real estate owners and operators to install EVC at little to no cost.

Because non-networked stations do nothing more than dispense power, networked “smart” charging stations will be necessary to manage both the driver and tenant experience. The ability to manage tenant/driver/third-party access, introduce or enforce associated policies and fee structures, and manage power usage can only be achieved with a networked solution. Additionally, networked EVC solutions enable real estate owners to extract new revenues, or recoup the costs of energy dispensed, from their initial investments. Employing creative methods to charge tenants or station users additional fees provides a means to offset the cost of installation and services over the life of the station.

The proliferation of EVs is already making an impact on the industry and real estate owners can position themselves to benefit from these changes by offering electric vehicle charging stations to their tenants and customers.

Part I: Understanding the EV Landscape

Introduction: Changes in the EV industry Will Have Significant Impacts on Real Estate

One of the most widely anticipated and important technological shifts expected over the next few decades is the global transition from internal combustion engine (ICE) vehicles to EVs. This change will not only affect the automobile industry, but also those interacting with it, including the real estate industry. RCLCO's analysis demonstrates that the proliferation of EVs is already making an impact on the industry and that real estate owners can position themselves to benefit from these changes by offering electric vehicle charging stations to their tenants and customers.

In this white paper we summarize why EV sales have grown and will continue to grow faster than those of their ICE counterparts, the different ways in which this change is likely to affect charging demand, and how real estate owners can proactively respond to this changing technological landscape.

Robust Historical Growth in EV Sales

Last year was another record year for EV sales in the US. As the country moves further along in its transition away from internal combustion engines, EV sales in the US increased by 80% between 2017 and 2018, growing the nation's total EV count to over one million.¹ This recent growth continues a consistently strong trajectory for this market, as EV sales grew by 49.7% per year between 2011 and 2017.² Automakers competing to stake a claim in this growing market have expanded their range of EV offerings across new makes and models, allowing consumers to choose from the most comprehensive selection of driver-friendly EVs yet.

EV Sales Projected to Grow at a Rapid Rate Over the Next 10 Years

Leading EV industry experts expect this rapid historical growth in EV sales to persist over the coming years and decades.

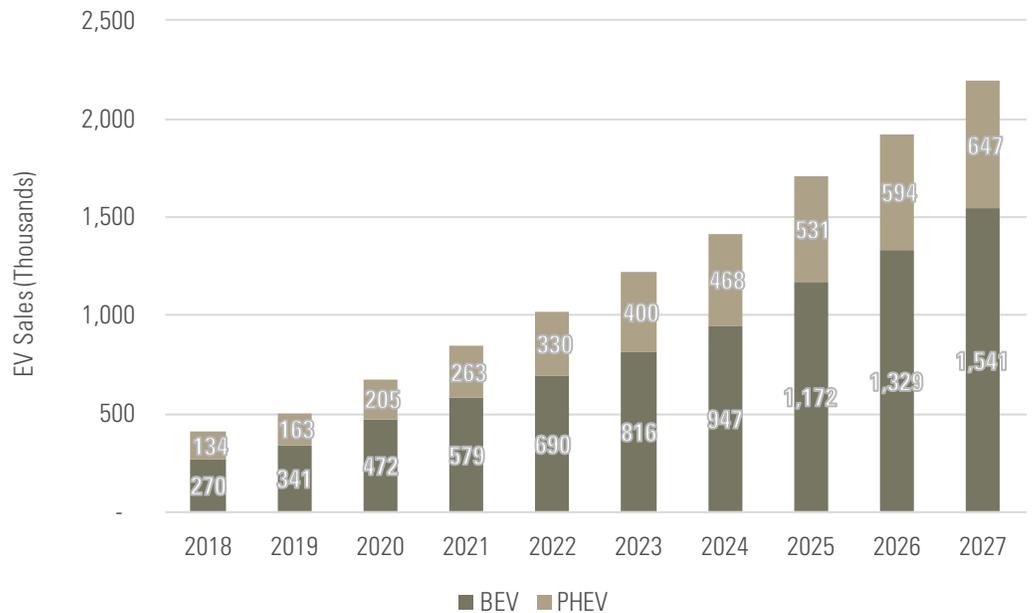
Research from Navigant estimates EV sales in the US will grow at a rate of nearly 20% per year from 2019 through 2027, nearly quintupling in size over the period. Similarly, J.P. Morgan predicts hybrid and EV sales will increase from 8.3% of North American vehicle sales in 2019 to over 38% in 2025.³

EV sales in the United States increased by 80% between 2017 and 2018.

EV sales in the United States and Canada will grow at a rate of nearly **20% per year from 2019 through 2027.**

The robust growth in EV sales will require rapid proliferation in EV charging infrastructure to support and serve the expanding market.

LD PEV Sales, US and Canada: 2018 to 2027 ⁴



The most important factor enabling this growth has been improvements in EV battery technology, including sizable declines in the price of the lithium-ion battery packs used in vehicle production. As technological advances continue to push down battery prices, the price of EVs is projected to rapidly approach cost parity with ICE models.⁵

Consumer demand for the product has grown as advances in technology have led to increasingly affordable EVs. For example, in CleanTechnica’s 2018 survey of American drivers, 57% indicated they expect to purchase a 100% electric vehicle within the next three years. Consumer research shows this strong demand stems from the desire to preserve the environment, reduce maintenance and fueling costs, and drive smoother, quieter vehicles.⁶

Working in tandem with surging demand and technological advancements, the EV market will also benefit from regulatory incentives, rebates, and network effects. Because EVs provide environmental benefits and better support America’s energy security compared to ICE vehicles, both federal and local governments offer financial and other incentives to support EV adoption. Examples include:

- » A federal income tax credit of up to \$7,500 offered to US residents for EV purchases
- » A rebate of up to \$7,000 for Californians who purchase or lease a zero-emission vehicle (ZEV) or hybrid
- » The State of New York’s “Charge NY” offering provides electric car buyers the Drive Clean Rebate of up to \$2,000 for new car purchases or leases
- » Access to high-occupancy vehicle (HOV) lanes in many states.

The significant demographic shifts in EV drivers will have large-scale impacts on where charging occurs and where charging stations need to be located, requiring a tailored response by asset class.

Further actions being taken at the state level include the establishment of nine Zero-Emission Vehicle (ZEV) States whose governments have adopted both California's Low Emission Vehicle (LEV) and its ZEV standards. They are: Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont. As part of its larger Advanced Clean Cars Program, California's ZEV program requires major manufacturers of passenger cars and light trucks (up to 8,500 pounds) to attain a certain number of ZEV credits depending on the number of vehicles produced and delivered for sale in the state. ZEVs include plug-in electric vehicles and hydrogen fuel cell vehicles.

These ZEV States are following California's lead in requiring automakers to produce ZEVs to improve local air quality and reduce the emissions contributing to climate change. Four other states, Colorado, Delaware, Pennsylvania, and Washington (as well as the District of Columbia) adhere to California's LEV standards but have not yet adopted its ZEV program. Together, all 13 states are referred to as "Section 177 States."⁷

While it is difficult to predict the direction of public policy, the trend toward promoting environmentally-friendly consumer choices suggests governments will continue to offer incentives in order to support the country's transition to widespread EV use.

The robust growth in EV sales requires rapid proliferation in EV charging infrastructure to support and serve the expanding market. The increasing need for EVC infrastructure presents an opportunity to benefit from the electrification of vehicles. Others who underestimate the imminence of EVs and corresponding requirements for infrastructure may find themselves disadvantaged.

Part II: What this Means for the Real Estate Industry

The Case for Charging Stations

In the past, providing parking was one of the few concerns real estate owners had with regard to transportation. Due to safety concerns and cumbersome infrastructure, fueling stations and maintenance locations are rarely integrated with other real estate uses. Conversely, EV charging stations are more affordable, mobile, and can be integrated within properties of all types, from single-family and multifamily homes to office buildings and retail centers. Unlike today's model in which drivers need to go to where fuel is supplied, EV driving residents/tenants, employees and customers will expect electric fueling to be available where they live, work, and shop. Consequently, the nature of transportation, and therefore fueling, has already begun to change. This synergistic model requires real estate owners to play an active role in providing the necessary infrastructure to support Americans' evolving driving and mobility habits.

Looking ahead, the overall demand for charging stations integrated within real estate assets is expected to multiply as the volume of EV drivers grows significantly, necessitating a proactive response from the industry. The significant demographic shifts in EV drivers will have large-scale impacts on where charging occurs and where charging stations need to be

EV charging stations are more affordable and mobile, and can be integrated within properties of all types—from single-family and multifamily homes to office buildings and retail centers.



located, requiring a tailored response by asset class. It is therefore crucial for real estate owners to understand where charging happens today and where it will happen tomorrow.

Advancements in Battery and Charging Technologies are Disrupting the Use Cases for Real Estate

Most EVs sold today are equipped with a lower power Level 1 (L1) charger as standard equipment. Advancements in both battery and charging technology (including L2 and L3 fast charging) have resulted in extended driving ranges and faster charging times.

Battery capacity is expected to continue to increase while manufacturing costs decline. Combined, these improvements in both capacity and charging speeds significantly extend the “miles per charge” values and range capabilities that EV drivers have come to expect from the sources they rely on for charging.

This change in EVC fundamentals will disrupt the use cases for real estate as more EV drivers choose to live in shared/multifamily environments. Today’s trend toward multifamily living means more EV drivers share access to faster Level 2 chargers. Shared EV chargers are intended to be used by the community (residential, office, etc.) at large, accessed by multiple drivers daily, and may not allow for “overnight” charging. This might include tenants, guest, employees, vendors, and more. In shared environments, the need for networked, controllable solutions that manage the tenant/driver experience is important. Real estate owners and managers benefit from networking features such as power management, access controls and vehicle queuing, which allow users of the service to “get in line” to charge while also managing fee/cost recapture.

Developers, investors and operators of residential as well as commercial properties, will be expected to provide access to the necessary L2 and L3 charging services. Additionally, developers will need to design and plan infrastructure deployment, in both pre- and post-development, with “future-proofing” in mind. Building for future use reduces costs and may prove preemptory as building codes for EV Charging “make-ready” requirements continue to proliferate.

EV Charging Application for Commercial RE

EV Charging Basics	Level 1	Level 2	Level 3 (DC Fast Charge)
Electrical Specifications	110-120 volts AC	208/240 Volts AC	208-480 Volts DC
Range Per Hour Charging	3-5 Miles	12-25 Miles	100-200+ Miles
Approx. Time to Full Charge**	18 Hours	2-4 Hours	15-45 minutes
Use Cases	Single Family Residential	Single Family Residential, Multifamily, Retail, , Mixed-use, Office	Retail, Commercial, Fleet, Hospitality, Mixed-Use, High-end Residential
Comments	Not practical for today's EV batteries and driver expectations	Aligns with charging at "home," workplace, around town, and between towns	

*** Actual time to charge will vary by specific auto make and model*

As EVs proliferate throughout the population, less affluent drivers will require access to faster charging in locations outside of single-family residences including workplaces, multifamily properties and retail locations. The distribution of charging stations and use cases for L2 charging will also shift in composition across land uses while increasing in magnitude for all of them.

What are the Variables Driving the Changes in Where EV Charging Happens and Where Charging Stations Will Need to Be?

RCLCO evaluated the key factors impacting EV growth and demand for charging infrastructure. We have assigned a score to each variable's relative impact on the growth in demand for charging stations within a respective land use. A score of "4" represents a strong increase in demand for charging stations within a land use, and "1" represents a low or neutral impact on demand. Collectively, these scores illustrate the differential growth of charging infrastructure among land uses.

For reference, we have grouped real estate land uses into the following four categories:

- » Single-Family Homes
- » Multifamily Homes
- » Office and Workplace
- » Retail and Hospitality

Industry experts estimate that nearly **100** new electric vehicle models will hit the road by 2022.

	Single-Family	Multifamily	Office	Retail / Hospitality
SUPPLY OF ELECTRIC VEHICLES				
Technological Improvements	3	3	3	3
Increased Vehicle Affordability and Diversity	3	3	3	3
DEMAND AND DEMOGRAPHICS				
"Massification" of EVs	1	4	2	2
Structural Shifts in RE	1	3	3	3
REGULATORY, INCENTIVES, AND UTILITIES				
Incentive Programs	2	3	3	3
LEED Certification	1	3	3	3

Factor 1: Supply of Electric Vehicles:

1a: Technological Improvements in Electric Vehicles

The maximum driving range of EVs has been a stated barrier to adoption for nearly 80% of non-EV owners.⁸ But, as the range of EVs approaches parity with ICE vehicles, EVs will become as feasible to own as traditional vehicles.

1b: Increased Affordability and Diversity of Makes and Models

As the price of electric vehicles decrease, overall EV sales will continue to increase. Industry experts estimate that nearly 100 new electric vehicle models will hit the road by 2022, including the highly-anticipated electric Ford F-150 Pickup, Mini Cooper SE, Ford

Mach 1, and Tesla Model Y.⁹ Property owners across all major land uses will need to increase the amount of EV charging stations offered as EVs become increasingly affordable and widespread.

Factor 2: Demand and Demographics

2a: “Massification” of Electric Vehicles: A Shifting Demographic

As battery prices have decreased, automakers have begun introducing a greater diversity of EVs that appeal to more mainstream sensibilities and price points. Tesla, recognizing the growing appetite for EVs among mainstream Americans, recently released the Model 3, which features a starting MSRP of \$38,990 and driving ranges between 220 and 325 miles. Reasonably-priced models offer drivers access to EVs for everyday use without forcing them to choose between insufficient battery range and steep price tags. Based on an analysis of automakers’ plans to roll out new EVs and third-party sales forecasts, RCLCO projects the EV marketplace to be evenly split between luxury and non-luxury makes by 2030.

As EVs become more affordable and available, the demographic characteristics of EV drivers are expected to shift to more closely resemble the general US population. Today, EV owners are overwhelmingly young and affluent and primarily located in coastal markets (nearly 44% purchased their electric vehicle in California).¹⁰ According to Navigant Research, nearly 70% of plug-in EV owners in 2018 were younger than 40 years old, with 64% of EV-owning households earning more than \$75,000 annually. In addition, more than 70% of current EV owners hold a four-year college or graduate degree and are disproportionately likely to live in single-family homes (over 80%) compared to Americans overall (63%).¹¹

Massification of EV Drivers

	2019	2030
Age	Nearly 80% are under age 40	Older than today, but majority still skews young
Income	Over 60% make more than \$75,000 per year	Far more middle income, driven by the projected even split between luxury and non-luxury EVs
Geography	Highly concentrated in coastal states	Still coastal, but increased adoption in non-coastal regions
Living Preferences	Nearly 80% live in single-family homes	Far more likely to live in multifamily homes

By 2030, EV owners will be more middle-income and more evenly distributed by age. They’ll also be more likely to rent and less likely to own a home. Therefore, we expect a greater need for charging in multifamily communities than exists today, with a relatively lower emphasis on charging at single-family residences. This dynamic will be driven by projected lower incomes and the higher propensity to rent. As fewer drivers will own

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homes, they will be more reliant on access to shared charging where they work and shared or dedicated charging where they live.

2b: Growing National Preference for Higher-Density Living

We expect a continued evolution in the housing, shopping, and employment preferences of people across the country in addition to changes in EV driver characteristics. There is growing national demand for higher density living situations among households of all ages and types, with an increasing share of American households choosing to rent. While renters make up only 37% of US households, they comprised an outsized share (59%) of new household growth between 2010 and 2019. This shift toward renter households is being driven by several factors, including delayed family formation among millennials, rising home prices, and a growing cohort of “renters by choice” seeking high-energy, urban lifestyles.

There is growing national demand for higher density living among households of all ages and types, with an increasing share of American households choosing to rent.

Commercial incentives tend to be significant, often covering 50%-100% of all EVC hardware, make-ready and ongoing service costs and station and/or infrastructure installation.

Renter Households vs. Growth in Renter Households



Sources: Esri; RCLCO

Factor 3: Regulatory, Incentives, and Utilities

3a: Government Charging Infrastructure Incentive Programs:

Government incentive programs at state, county, and municipal levels can dramatically reduce the cost of installing charging stations. According to a 2018 industry survey conducted by CleanTechnica, about 16% of charging station installations used government subsidies totaling more than \$1,000, while another 20% received benefits of less than \$1,000.¹² The availability of these rebates reduces the cost of charging stations across all land uses and facilitates their installation.

Commercial incentives tend to be significant, often covering 50%-100% of all EVC hardware, make-ready, and ongoing service costs and station and/or infrastructure installation. For example:

- » Colorado provides rebates to multi-unit dwelling owners and private businesses for up to 80% of charging station cost
- » Delaware subsidizes up to 75% of the cost of commercial and workplace chargers
- » Connecticut provides rebates to private businesses for up to 50% of cost
- » Hawaii will subsidize 100% of the cost of installation ¹³

Moving forward, the availability of charging station incentives for high-density residential and commercial real estate is expected to further shift the balance of charging stations in favor of these land uses.

The table below highlights a small sample of the variety of Electric Vehicle Supply Equipment (EVSE) rebates and grants available to commercial property owners. While both rebates and grants can help offset the cost of EVSE installation, it should be noted that rebates are often far more accessible to commercial property owners than grants and, therefore, are especially important to pursue.

Selected Commercial EVSE Rebates and Tax Credits by State

Name of State	Summary of Rebate Offered
Arizona	» Rebate: Salt River Project (SRP) offers up to 12 rebates of up to \$500 to business customers who purchase and install level 2 EVSE's for use by their employees.
California	» Rebate: LADWP's Charge Up LA! Program offers a \$500 rebate for the installation of an EV charger and an additional \$250 and 2.5 cents/ KWh discount with a separate meter TOU rate enrollment. Rebate: Southern California Incentive Project (SCIP): Promotes access to electric vehicle charging infrastructure by offering rebates of up to \$80,000 for the purchase and installation
Colorado	» Grant: Charge Ahead Colorado statewide program: CEO and RAQC grants will fund 80% of the cost of EVSE, up to \$9000 for a level 2 dual-port station and up to \$30,000 for a DC fast charging station.
Connecticut	» Grant: The Connecticut Department of Energy and Environmental Protection (DEEP) provides funding to municipalities, state agencies, and private businesses for the cost and installation of eligible EVSE. Funding is available for 50% to 100% of the project costs. » Gorton Utilities customers may be eligible for a \$600 rebate towards level 2 EVSE.
Delaware	» Rebate: The Delaware Department of Natural Resources and Environmental Control offers rebates for new EVSE purchases, which amount to 50% of EVSE costs (up to \$500) for residential properties, 75% of EVSE costs (up to \$2,500) at commercial properties, and 75% of EVSE cost (up to \$5,000) at workplace properties.
Maryland	» Rebate: The Maryland Energy Administration provides rebates for the purchase and installation of EVSE of up to 40% (up to \$700) on residential properties, up to 40% (up to \$4,000) on commercial properties, and up to 40% (up to \$5,000) on retail service stations.
New York	» Rebate: The New York State Energy Research and Development Authority (NYSERDA) offers a \$4,000 rebate per charging port for employers, building owners, municipalities, and non-profit organizations to install level 2 charging stations.

Source: Plug Star, Chargepoint

LEED grants an additional point towards certification to buildings that install electric vehicle charging stations in 2% of their parking spaces.

Municipalities have experimented with mandates requiring EV charging installation. For example, the City of San Jose recently passed EV charging requirements mandating that all new multifamily buildings make 70% of parking spaces EV-capable, 20% EV-ready, and 10% fully equipped EVSE spaces. These and similar programs have placed mounting pressure on developers to equip their buildings with charging infrastructure during development, rather than installing post development at much greater cost.

3b: LEED Certification Requires EVC Installation

A non-financial incentive for installing electric vehicle charging stations is the opportunity to receive Leadership in Energy and Environmental Design (LEED) certification. LEED certification is a highly-sought-after title for sustainability-minded multifamily and commercial properties, and offers a degree of prestige to buildings that can help improve positioning and attract blue-chip tenants. LEED grants an additional point towards certification to buildings that install electric vehicle charging stations in 2% of their parking spaces. For property owners seeking the increases in the positioning, attractiveness, and sustainability that come with LEED certification, the installation of electric vehicle charging solutions can move them one step closer to that goal.

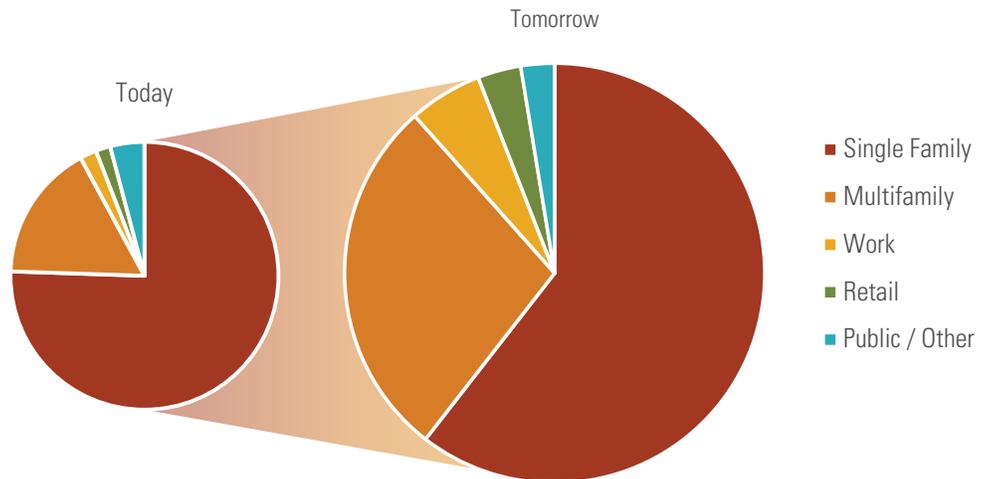
Synthesis: EV Charging Shifting Away from Overemphasis on Single-Family: Multifamily, Office, Retail, and Hospitality Growing in Importance

In light of the above factors, RCLCO predicts that the following shift in the distribution of charging station locations will occur by 2030:

A higher emphasis on multifamily, office, retail, and hospitality charging and a lower emphasis on single-family charging than exists today as more individuals choose to live in multifamily/mixed-use residential.

A higher emphasis on multifamily, office, retail, and hospitality charging and a lower emphasis on single-family charging than exists today as more individuals choose to live in multifamily/mixed-use residential.

Estimated Distribution of EV Charging



Note: Graphic for representational purposes only, not an exact projection.

Part III: Opportunities for Real Estate Owners and Operators

Major questions face developers today regarding the timing and urgency of installing charging stations, such as “When is the EV wave coming?” and “When do developers need to respond?” RCLCO’s analysis suggests that, given the robust recent and projected growth in EV sales, the shift in favor of EV adoption is already occurring. Consequently, property owners are—or should be—planning or actively implementing charging station infrastructure in their assets. The opportunity becomes more acute while utility rebates, which can reasonably be expected to reduce as adoption continues to accelerate, are robust.

Several push- and pull-factors will drive real estate owners to install EVC and benefit from near and long term upside potential. To understand these factors, we conducted case studies of Class A and B multifamily and office buildings in Los Angeles, Seattle, and St. Louis, examining the relative immediacy, or benefits, of offering charging station infrastructure.

These case studies demonstrate that the push factors that necessitate EV adoption (identified below) can vary by product type. Consistent among these factors is the need to protect and “future-proof” assets to prevent value erosion, especially given a longer-term investment horizon.

- » **Multifamily Has Most Immediate Need for EV Charging Installation:** While the relative importance of residential charging is expected to decline in relation to other sources of EVC access, homes will continue to be the favored place to charge. Multifamily renters, who constitute the largest growing share of EV buyers, will no longer see the availability of charging stations at home as a luxury. It will be a necessity that can dictate where they choose to live. In markets such as Los Angeles and Seattle, Class A multifamily properties already overwhelmingly offer EV charging stations, indicating that it is seen as a necessity by tenants in these markets and cannot simply be offered as a “perk” or “amenity.” This suggests an immediate need for top-of-market multifamily owners to offer charging stations or risk losing new and turnover tenants if they delay installation.
- » One example of well-executed EV charging integration is at the newly constructed Argyle House in Los Angeles. Nearly 10% of parking spaces at this development are fully equipped with EV charging stations. Managers at the building emphasize that these parking spaces are viewed as a necessity rather than a luxury amenity, as a high proportion of EV drivers residing in the building actually do *need* chargers.

Property owners are—or should be—planning or actively implementing charging station infrastructure in their assets.

There is a need for top-of-market multifamily owners to offer charging stations or risk losing new and turnover tenants if they delay installation.

“Electric vehicle charging stations are at an inflection point. They have become a necessity for class A buildings located in coastal markets.”

– Multifamily Housing Development Executive

As a growing share of commuting workers drive EVs—and as an increasing number of tenants’ visitors and clients drive EVs to office buildings—there is an expectation among tenants that charging stations will be offered at the workplace.

	LOS ANGELES		SEATTLE		ST. LOUIS	
	OFFER CHARGING STATIONS?	AVG. RENT/SF	OFFER CHARGING STATIONS?	AVG. RENT/SF	OFFER CHARGING STATIONS?	AVG. RENT/SF
Class A	Yes	\$3.66	Yes	\$3.67	Some, not all	\$1.99
Class B	No	\$2.78	No	\$3.02	No	\$1.45
Class A Premium		31.7%		21.8%		37.0%

» **Offices Increasingly See EV Charging as a Necessity:** As EV charging stations have become a necessary component of a building’s infrastructure in many markets, office owners have the next-highest level of urgency. As a growing share of commuting workers drive EVs—and as an increasing number of tenants’ visitors and clients drive EVs to office buildings—there is an expectation among tenants that charging stations will be offered at the workplace. Similar to multifamily properties, all Class A and some Class B office buildings in Seattle and Los Angeles already offer charging stations, indicating that office properties that wish to remain competitive in these markets cannot avoid providing charging infrastructure.

» **In Los Angeles, WeWork’s EV-ready Maxwell office building has equipped 5% of its spaces with electric vehicle charging stations.**

	LOS ANGELES		SEATTLE		ST. LOUIS	
	OFFER CHARGING STATIONS?	AVG. FSG RENT/SF	OFFER CHARGING STATIONS?	AVG. FSG RENT/SF	OFFER CHARGING STATIONS?	AVG. FSG RENT/SF
Class A	Yes	\$4.03	Yes	\$3.65	Some, not all	\$2.21
Class B	Some, not all	\$3.14	Some, not all	\$3.13	No	\$1.46
Class A Premium		28.3%		16.7%		51.4%

» **Retail and Hospitality: EV Charging Installation Offers Upside and New Opportunities:** While renters and office workers who own EVs must charge at home and/or work, visitors to retail centers can plan routines such as shopping or dining to either avoid charging altogether or based on access to EVC. So, although the urgency for other uses (i.e. retail and hospitality) is high, it is somewhat lower than for multifamily and office. We expect this dynamic to change as EVs proliferate, as the growing ubiquity of EVs will render these workarounds increasingly inconvenient and potentially serve as a deal-breaker when choosing where to shop, dine, or stay.

The growing ubiquity of EVs will render these workarounds increasingly inconvenient

Across all product types, the relative low costs associated with charging infrastructure installation during construction as compared to retrofitting a project is incentivizing developers to act early.

for drivers and potentially serve as a deal-breaker when they are choosing where to shop, dine, or stay.

- » **Cost Reductions. The Case for Installing Infrastructure Now:** Across all product types, the relative low costs associated with charging infrastructure installation during construction as compared to retrofitting a project is incentivizing developers to act early. These cost savings, which can reach 3x to 5x when included in planning/design phases versus post-delivery, are especially important for projects currently under construction, since the market will almost certainly demand EV charging stations when the buildings deliver. Moreover, make-ready expenses are often the largest expense incurred in the EVC installation process. Many developers are choosing to proactively install charging infrastructure in anticipation of market demand due to the cost savings available during construction.

In addition to the defensive “push” factors noted above, there are also offensive “pull” factors that create upside for developer/owners who offer EV charging infrastructure:

- » **Flexibility with EV Charging Installation and Rollout Can Minimize Cost and Mitigate Future Risks:** Because EV charging infrastructure is installed separately from EV charging stations themselves, real estate owners can fit their buildings with the infrastructure needed to future-proof their investments at minimal upfront cost. Buildings with charging infrastructure can then enjoy plug-and-play capabilities with different amounts of charging stations in order to adapt to demand as they see fit.
- » **Networked Charging Stations Offer Operational Flexibility, Enhanced User Experience, and Access to Behavioral Data:** EV charging stations are delivered as either networked or non-networked. In essence, networked chargers are connected wirelessly via the Cloud. Some charging stations include software that connects the stations to an integrated network. These networked charging solutions allow real estate owners to control energy pricing, assess how their stations are performing, collect data on users, and set limits on energy use, among other tools. This enables significant upside potential for property owners seeking to minimize expenses or to better understand their tenants’ habits and behaviors.

These networked solutions also materially improve the tenant experience of charging, as they enable EV drivers to find networked stations online, receive charging updates via SMS, and manage a single network account to oversee all of their charging activity. One charging industry executive highlighted the importance of these features, claiming “the ability to provide increasingly-connected types and levels of service will almost certainly be a requirement by owner/operators as well as their tenants. There are significant indications of this trend occurring today.” Others favor networked charging stations simply for their ability to provide real-time adjustments to reflect and/or re-capture costs for electricity dispensed based on usage or to place caps on the maximum amount of time that drivers can utilize the service. In either case, networked stations provide undeniable advantages over less sophisticated charging systems.

Networked solutions materially improve the tenant experience of charging.

Smart stations provide important EV driver and system data including usage time, net new drivers, power consumed, cost of power and dwell times, among other key operational data.

Offering EV charging stations is a contributing factor to properties achieving top-of-market positioning.

Real estate owners can extract sizable revenues from charging stations.

Perhaps the most valuable advantage conferred from networked charging is the behavioral information it captures. Smart stations provide important EV driver and system data including usage time, net new drivers, power consumed, cost of power and dwell times, among other key operational data. These data sources can help inform critical development, marketing, leasing, and property management decisions, especially for office and retail owners. An industry executive at a publicly-traded REIT emphasized the value of demographic data at shopping centers, which enabled the REIT to better understand the types of visitors received, their visitation patterns, and their behaviors. This data allowed them to make better and more strategic decisions with respect to future tenant selection.

Companies such as ChargePoint allow networked station owners to manage their investments in real-time.¹⁴

» **EV Charging Offers an Opportunity to Improve Asset Positioning:** Our case study research suggests that offering EV charging solutions is a contributing factor to properties achieving top-of-market positioning. For example, all of the Class A multifamily and office properties surveyed in Los Angeles and Seattle offer EVC. These properties earn a significant premium ranging, on average between 22% and 32% above Class B properties in comparable locations. While it is difficult to isolate these premiums to EV charging solutions alone, it is clear that offering charging infrastructure contributes to achieving Class A positioning and the sizable premiums associated with it.



- » **Operational Flexibility Enables New Revenue Streams:** Real estate owners can extract meaningful revenues from charging stations, similar to strategies of in-place revenue models for other necessary building services, such as dedicated parking spaces. In most cases, real estate owners wanting to monetize their EVC investments currently charge between \$25 and \$50 per EV spot, per month. We identified a few strategies used by owners to drive these revenues from charging stations. Property owners can:
- » Charge customers a fee for each use of their charging station that reflects local competitive dynamics for like services
 - » Charge customers to rent a dedicated electric vehicle space and earn a return on the cost of the charging station
 - » Shift charging station purchase and installation costs to tenants as part of their common area maintenance expenses and offer the stations free to users
 - » Offer charging stations as a free amenity for tenants and build the price of the stations into tenant rent payments



A property's success and performance will rely at least in part on its anticipation of, and proactive response to, these shifting trends in EV adoption.

Conclusion

Real Estate Owners Will Need Charging Infrastructure

The exponential growth of the EV market in recent years, which is projected to continue over the next decade, will necessitate significant shifts and responses throughout the real estate industry. Most notably, a pressing need is emerging for charging infrastructure to keep pace with, and enable, the robust growth in EV sales. As EVs proliferate, so too will the volume of charging stations, necessitating a strong response from real estate owners whose portfolios will be expected to install and make available vital charging infrastructure. Real estate owners and operators, therefore, need to pay close attention to the ways in which EV growth and adoption are impacting real estate asset management and driving changes in tenant demands and preferences. A property's success and performance will rely at least in part on its anticipation of, and proactive response to, these shifting trends in EV adoption.

Commercial Property Owners Can Make Electric Vehicles Good for Business

RCLCO estimates that the confluence of these trends will drive order-of-magnitude increases in the overall number of charging stations required over the next decade. Importantly, we also project that the relative distribution of charging stations among land uses will change, with a greater emphasis on charging in multifamily, office, and "on-the-go" locations. This marks a shift away from the existing prominence of EV charging at single-family homes and the expectation that retail, office, and residential properties will provide those services. Commercial property owners can turn these powerful economic forces into tailwinds by anticipating and profitably serving these new consumer needs.

There Are Clear Advantages to Being Proactive about EV Infrastructure Installation: "Wait-and-See" Approach Results in Significantly Higher Costs down the Road

Today, real estate owners, developers, and operators are already anticipating these trends and introducing charging stations in their assets. For some assets, particularly top-of-market properties in coastal and affluent markets where EV adoption is strongest, charging station implementation is a defensive strategy, undertaken by a property to avoid losing tenants, prestige, and positioning to competitive properties that have already installed charging stations. For other assets, such as Class A minus or B properties, charging station implementation offers a strong offensive strategy that will enable premium positioning and asset differentiation in increasingly crowded competitive markets.

Commercial property owners can turn these powerful economic forces into tailwinds by anticipating and profitably serving these new consumer needs.

Pre-development EV installation can be dramatically cheaper than post-development, particularly when paired with the wide variety of government and utility incentives offered today.

In addition to these varying market factors, RCLCO interviewed property owners across geographies, product types, and classes. All these owners emphasized the substantial operational benefits and flexibility afforded by deploying networked charging stations proactively. Pre-development EV installation can be dramatically cheaper than post-development, particularly when paired with the wide variety of government and utility incentives offered today. The opportunity to extract significant revenue from networked (versus non-networked) charging stations provides a way to offset the cost of ownership. Networked solutions also offer flexibility and the ability to phase installations over time, while delivering a high volume of consumer data. Each of these capabilities were cited by owners as offering additional upside to encourage charging station implementation.



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