



CITY OF GLENDALE, CALIFORNIA REPORT TO THE CITY COUNCIL

AGENDA ITEM

Report: Reach Code - Building Electrification

1. Motion providing direction on options to be included in a reach code for Building Electrification, Photovoltaic (PV) and Electric Vehicle (EV) Charging to amend Title 24 of the California Building Code or adopt an amendment to the Glendale Municipal Code.

COUNCIL ACTION

Item Type: Action Item

Approved for September 13, 2022 **calendar**

EXECUTIVE SUMMARY

The City of Glendale hired Rincon Consultants, Inc. (Rincon) to assist in the preparation of a Building Electrification, Photovoltaic (PV) and electric vehicle (EV) charging Reach Code Ordinance. On June 22, 2022, Rincon delivered a memorandum outlining current best practices for reach code development and adoption in California. Based on an analysis of several criteria, including effectiveness in reducing greenhouse gases (GHGs), the feasibility of implementation, and cost-effectiveness, the following proposed ordinance modifications have been identified as best practices for the City of Glendale to consider in the effort to mitigate GHG and work towards achieving the State of California's carbon neutrality target of 2045.

Building Electrification: Require all new construction (including standalone additional dwelling units, [ADU]) to be all-electric with no exemptions except as permitted by an infeasibility waiver.

- This approach advances the most substantial climate benefit by requiring developers to prove the infeasibility of building electrification instead of categorizing entire building types as electrification exempt.
- This structure maximizes long-term cost savings by keeping new gas infrastructure from being deployed, as most, if not all, new buildings in the City will be electrified (Gridworks 2020).

PV Infrastructure: Require non-residential and multifamily PV systems to be installed on all new buildings to at a minimum, offset 50 percent of projected electricity use or cover at least 50 percent of rooftop space. Include an infeasibility waiver for projects unable to meet the requirement due to shading or other constraints.

- This approach allows for PV installation sizes that produce a more ambitious GHG reduction for lower density buildings while allowing flexible implementation in Glendale’s urban environment, where buildings with a large energy footprint may have a small available amount of rooftop space.
- The suggested percentages in this ordinance can be further adjusted.
- Current percentages based on existing example ordinances

EV Charging Infrastructure: Glendale may consider adopting the CALGreen Tier 2 requirements for EV charging, which will expand EV charging infrastructure in all new residential and commercial locations, including multifamily buildings. Where:

- One or Two-Family homes/ Low-rise Multifamily:
 - One *Level 2* (40- to 100-amp breaker on a 208- or 240-volt alternating current (AC Circuit)) EV-Ready space per unit and Level 1 Circuitry (‘slow charging’).
- Multifamily, Hotels & Motels:
 - <20 Spaces: 40% of parking spaces must be EV Ready
 - >20 Spaces: 15% of total parking spaces to have Level 2 EVSE (Electric vehicle supply equipment)
- Other non-residential:
 - Adopt an additional 10% Level 2 EV Charging requirement and 15% Level 2 capable spaces requirement for new non-residential buildings with 10 > spaces

Existing Building Requirements: In addition to the new construction ordinances suggested above for all electric buildings, additional solar PV, and EV charging, the City also has the option to expand some or all of these requirements to substantial remodels (remodels over a designated size or dollar amount).

COUNCIL PRIORITIES

Environmental Stewardship: Implementation of building electrification, PV and EV charging are currently cornerstones of modern climate action planning and can lay the foundation for significant GHG reduction across the building and transportation sectors.

Infrastructure: Electrifying our homes has major health benefits. Burning gas releases nitrogen oxides and particulates, which can have serious health consequences.

RECOMMENDATION

City Council provide direction on options to be included in a reach code for Building Electrification, Photovoltaic (PV) and Electric Vehicle (EV) Charging to amend Title 24 of the California Building Code or adopt an amendment to the Glendale Municipal Code.

BACKGROUND

The City of Glendale is considering three new reach codes which would be adopted through the 2023 California Building Code Title 24 code cycle. These codes are being proposed to help Glendale mitigate GHG emissions and health and safety concerns while taking advantage of cost savings and avoiding future retrofits. These reach codes would go beyond the State's minimum requirements for buildings required by California Title 24 Building Code to emphasize even more significant energy savings and GHG reductions through the following new codes:

- Electrifying new construction,
- Expanding local solar generation and
- Increasing EV charging capacity

At the September 22, 2020 City Council meeting, staff presented a report asking for direction requiring commercial development in Glendale to provide rooftop solar photovoltaic systems. In the report, staff concluded in part; *“Should City Council decide to pursue adoption of a Reach Code requirement for commercial photovoltaic, further study would need to be conducted toward that aim. In addition to a Glendale-specific cost-effectiveness study for commercial photovoltaics, City Council may desire to include other provisions within the Reach Code, which would require further study.”*

City Council directed staff to explore hiring a consultant team to determine the feasibility of adopting a commercial photovoltaic requirement. In addition, City Council also asked that any reach code study include information on building electrification, EV charging, battery storage and cool roof requirements.

Due to the complexity of this issue, at the March 22, 2022 City Council meeting staff

recommended that a consultant be hired to provide technical assistance and support to staff to assist in the development of a potential reach code and associated ordinances for the City of Glendale.

Based on direction from City Council, Rincon was hired to provide technical services and support to the City of Glendale for the development of building electrification, PV infrastructure, and EV charging ordinances.

As part of this work scope Rincon has been tasked to do the following:

- Draft a memorandum with ordinance options and best practices from other jurisdictions (attached to this Report as Exhibit 1);
- Develop draft ordinances for building electrification, photovoltaics, and EV infrastructure;
- Support the outreach and engagement process to refine the ordinances; and
- Support City staff on the reach code development and adoption process

This staff report outlines the recommendations from the Memorandum developed by Rincon (Exhibit 1).

ANALYSIS

The Rocky Mountain Institute (RMI), an independent, non-partisan, nonprofit organization, has identified building electrification as a critical strategy for combatting climate change and reducing greenhouse gas emissions. RMI outlines the benefits of building electrification including:

1. Building Electrification Creates Healthy Homes and Living Environments
2. Building All-Electric Homes Is Less Expensive Than Building Homes with Fossil Fuel Appliances
3. Building Electrification Can Be a Transformative, Positive Force for Low-Income Residents and Communities of Color
4. Gas Infrastructure Costs Are Soaring

All-electric construction is already the standard in many US states. Nearly 60 percent of new homes nationwide are built all-electric, and more new homes use heat pumps than any other technology.

Implementation of building electrification, PV, and EV charging is currently the cornerstone of modern climate action planning. It can lay the foundation for significant GHG reduction across the building and transportation sectors. According to the

California Energy Codes & Standards *Cost-Effectiveness Study* (2019), all-electric low-rise residential buildings are less expensive to build and operate than mixed-fuel buildings in most of Glendale (in Climate Zone 9). The results also show that including a PV system increases the cost-effectiveness of all electric buildings. While EV charging ordinances can provide for consistent design, reduce installation costs, mitigate GHG emissions that fuel climate change and, bring more equity to underserved communities.

How does Glendale benefit from All-Electric New Construction?

- **Natural gas use in buildings is a significant contributor to climate change.** Nationwide, the majority of emissions from businesses and homes come from the combustion of fossil fuels (like natural gas) for heat. Reducing these emissions through electrification as the California grid goes carbon-neutral by 2045 will be a crucial strategy in City-level climate action planning.
- **Cleaner indoor air equals increased community health.** All-electric induction stoves and appliances do not emit air pollutants in indoor spaces, providing healthier indoor air quality. Natural gas-powered appliances, especially gas stoves, can spike emissions of carbon monoxide and nitrogen dioxide emissions.
- **All-electric homes and businesses can save consumers money.** Natural gas prices are expected to increase over time, as infrastructure to transport natural gas stays the same, but the number of customers decreases as homes and businesses electrify. Electrifying new buildings now will save home and business owners future costs of retrofits and shield them from rising natural gas prices. Furthermore, with the new code, building all-electric saves money up front and, when paired with expanded solar, can also save residents money on their bills.

Local Solar:

- **Solar + electrification = cost savings.** California Energy Codes and Standards' analysis shows cost savings for the community through improved grid reliability, decreased emissions, and on-bill savings.
- **Local solar generation can increase grid resiliency.** When paired with increased storage system updates, local power generation through solar can contribute to electrical grid demand reduction. This increases grid resiliency on days when there is high-electric demand (ex. a hot summer day when there is an increased use of air conditioning).

EV Charging:

- **Decrease emissions from one of the biggest GHG emitting sources.**
Transportation accounts for around 50% of California’s GHG emissions, most of which comes from gasoline combustion in passenger vehicles. As the California grid goes carbon-free by 2045, EVs will be key in reducing these sources of fossil fuel combustion emissions.
- **Increase Glendale’s preparedness for future EV Demand.** California State policy has aggressive targets for adopting zero-emissions vehicles and charging infrastructure, with a target of 100% in-state sales of passenger cars and light duty trucks by 2035 (Executive Order N-79-20).
- Increasing charging infrastructure for this uptick in electric vehicle usage will be critical to keeping up with statewide trends. Building in EV charging in the design phase will also save home and business owners future costs of installing EV chargers.

Reach Code Recommendations Summary

The Memorandum provided by Rincon (Exhibit 1) outlines current best practices for reach code development and adoption in California. Based on an analysis of several criteria, including effectiveness in reducing GHGs, the feasibility of implementation, and cost-effectiveness, the following ordinance modifications have been identified as best practices for the City of Glendale in the effort to mitigate GHG and work towards achieving the State of California’s carbon neutrality target of 2045.

Findings provided by Rincon in the Memorandum are outlined below. The Memorandum offers comprehensive justification for developing a reach code that may include the following aspects.

Ordinance Adoption Pathways

There are two primary pathways for ordinance adoption: a local building code amendment of Title 24 or a municipal zoning or health and safety amendment. Both pathways have been taken by other jurisdictions and are feasible for Glendale. A summary of the pros and cons of each approach are summarized immediately below, in Table 1.

Table 1

Policy Type	Pros	Cons	Notes
1. Building Code- Local Amendment to Title 24 (Reach Code)	<ul style="list-style-type: none"> Can be adopted as part of building code update already underway Majority of cities have taken this approach May cover buildings that are already entitled (but have not had building permits issued) 	<ul style="list-style-type: none"> Requires CEC approval and cost-effectiveness study (except for electric vehicles) Climate zone 16 could be challenging to prove cost-effectiveness (pending 2022 cost-effectiveness numbers) 	Local amendments to Title 24 are common and encouraged by the CEC and Local Codes and Standards team. Cost-effectiveness studies are readily available.
2. Municipal Zoning or Health and Safety Code Amendment (Municipal Ordinance)	<ul style="list-style-type: none"> Can proceed without CEC approval or cost-effectiveness study Not required to renew every code cycle 	<ul style="list-style-type: none"> May not cover buildings which have already been entitled Uncertainty on existing or potential legal challenges Less common (although several examples are available) 	Although less common, pursuing a municipal zoning or health and safety code ordinance provides some benefits such as removing the need for a CEC approval or cost-effectiveness study. No need to update every 3 years which could be a pro or con depending on perspective.

CEC = California Energy Commission

Staff recommends that the Building Code-Local Amendment to Title 24 (Reach Code) is the most appropriate approach for the City of Glendale. This would require Staff to review the California Building Code at the tri-annual update and to determine if any amendments of the Reach Code Ordinance would be necessary.

Procedure and Findings Required for Adopting Reach Codes

California Energy Commission (CEC) approval would be required for the proposed reach codes affecting Title 24. The City would submit to the CEC the reach codes, supporting materials, and required findings to the CEC, along with relevant CEQA documents. The Reach Codes must be supported by an analysis and findings regarding the reach code’s energy savings and cost effectiveness and a statement or finding that the local energy standards will require buildings to be designed to consume no more energy than permitted by Part 6 of Title 24 of the Energy Code.

BSC Submittal & Review

Reach codes must also be submitted to the Building Standards Commission (BSC) for approval. BSC approval would be required for all three categories of the proposed reach code amendments – electrification of buildings, PV, and EV. The reach code must

be supported by findings that amendment is necessary because of local climatic, geological, or topographical conditions, along with the justification.

Building Electrification Infrastructure

Building electrification reach codes have taken several forms, including electrification of some but not all appliances, electric preferred, all-electric ready, and full natural gas bans. Exemptions for specific end uses (such as stoves) mean no decrease in natural gas infrastructure development. However, an infeasibility waiver process should be outlined in the ordinance to allow for specific process loads which cannot currently be all electric to have a path forward. An infeasibility waiver process places the burden on the project applicant or developer to prove that construction of the new building entirely without gas is not feasible, reducing the burden on City staff and removing the need to make whole categories of buildings exempt.

For these reasons, building electrification of all new buildings with no exemptions presents the strongest future climate and cost benefit to the City of Glendale. In this scenario, all new construction (including standalone additional dwelling units, [ADU]) must be all-electric with no exemptions, except for an infeasibility waiver.

- This approach advances the strongest climate benefit by requiring developers to prove the infeasibility of building electrification, instead of categorizing entire building types as electrification exempt.
- This structure maximizes long-term cost savings by keeping new gas infrastructure from being deployed, as most, if not all, new buildings in the City will be electrified (Gridworks 2020).

Building Electrification Summary:

- *What types of buildings will be included?*
 - All residential and non-residential buildings, as well as detached ADUs.
- *What does electrification cover?*
 - New construction will require the installation of electric appliances like heat pumps and induction stovetops. Gas lines will not be installed in new buildings where feasible.
- *What is an infeasibility waiver, and when does it apply?*
 - An infeasibility waiver can be applied for by the building developer if the technology for an all-electric proposed building is impossible to acquire/use.
 - Infeasibility waivers will only cover the specific end use that is not deemed feasible such as specific process loads.

How the proposed building electrification reach code exceeds Title 24	
Title 24 Requirements (2022)	Proposed New Building Electrification Reach Code
Residential: Electrification Ready + heat pump water heating or space heating standard. Gas installation still allowed.	All buildings: <ul style="list-style-type: none"> • <i>Full instead of partial electrification, default is electric building</i> • Fully electrified (all electric appliances, not just heat pumps/space heating) • No gas installed without successful infeasibility waiver application
Non-Residential: Heat pump for HVAC/water depending on building type. Gas installation still allowed.	

Photovoltaic Infrastructure

Glendale’s existing building stock is urban and has a significant number of high-density buildings with limited roof space. This presents two challenges to installing PV infrastructure in Glendale. First, tall buildings may not be able to fit large arrays on their limited roof space. Second, large buildings with high-energy demand (ex. industrial buildings, refrigerated warehouses) may not be able to generate enough energy to offset a high percentage of their energy spend even if they used their entire roof space for PV.

Due to physical limitations associated with PV sizing on different building types, a variety of strategies have been developed that are intended to encourage the installation of PVs across a wide breadth of building types.

Table 2 summarizes the options for PV ordinances, as well as the pros and cons of each approach.

Table 2

Policy Type	Pros	Cons	Rincon Recommendation
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<p>1. PV system that establishes a minimum % of rooftop space (50%) if an array sized to offset 50% of the building's energy spend is not feasible.</p>	<ul style="list-style-type: none"> ▪ PV, particularly large arrays, end up being long-term cost effective ▪ Greater savings when combined with energy efficiency ▪ Can produce greater GHG reduction over building life 	<ul style="list-style-type: none"> ▪ Can be a large incremental cost ▪ Variable investment requirements distributed across different project types/developers ▪ Physical constraints on rooftop 	<p>Maximum Climate Benefit, Adapted to Glendale's urban environment with potentially variable rooftop space. <i>Note that this recommendation blends together two policy approaches (% offset energy spend and % rooftop installation)</i></p>
<p>2. Small minimum PV size requirement based off building square footage</p>	<ul style="list-style-type: none"> ▪ Greater savings when combined with energy efficiency ▪ Small minimum system size allows project sizing flexibility ▪ Cost-effective under most major project scenarios 	<ul style="list-style-type: none"> ▪ Requires external documents and/or calculations ▪ If install minimum only, offsets small percentage of total usage 	<p>Medium Climate Benefit; High Feasibility (largest # of adopters) Cost-Effective</p>
<p>3. PV system requiring some percentage of offset projected annual electricity usage</p>	<ul style="list-style-type: none"> ▪ Greater savings when combined with energy efficiency ▪ Cost effective under most major project scenarios ▪ Can produce more ambitious GHG reduction over the life of the building 	<ul style="list-style-type: none"> ▪ Can be a considerable incremental cost ▪ Variable investment requirements ▪ Physical constraints on rooftop ▪ Sizing may not be feasible for different project sizes 	<p>Not Recommended without adaptation for urban rooftop space (%) as does not include considerations for roof size, Less Feasible, Climate-Ambitious</p>

PV = photovoltaic

A recommendation is to require non-residential and multifamily PV systems to offset 50 percent of projected electricity use if roof space is sufficient, or cover at least 50 percent of rooftop space for buildings where a 50 percent offset of building electricity usage by a PV array is not possible. Exclude any specific exemptions.

Reasoning: This ordinance presents a hybrid-model between mandated percentages for roof size and energy spend, allowing for flexibility while maximizing GHG reduction and local renewable energy production.

Ordinance aspect: Physical infeasibility waiver (e.g., shading, vegetation, other structures). The burden falls on the project applicant to prove infeasibility.

Photovoltaic Summary

- *What types of buildings will be included?*

- Non-residential & high rise multifamily. Single family and low-rise multifamily buildings are not included in the proposed reach code because they are already subject to PV requirements under the California Building Code.
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- *What is an infeasibility waiver, and when does it apply?*
 - An infeasibility waiver can be applied for by the building developer if the project is physically unable to meet the requirement due to shading or other constraints.

How the proposed PV reach code exceeds Title 24	
Title 24 Requirements (2022)	Proposed New PV Reach Code
Residential (Single Family): Prescriptive requirements for PV and battery.	All multifamily & commercial: <ul style="list-style-type: none"> • Roof space or energy spend 50% requirement <i>is more ambitious</i> than system size equation under Title 24 for many building types which is based on floor size square feet
Residential (Multifamily): Prescriptive requirements for PV and battery.	
Non-Residential: PV and battery storage required for prescriptive approach.	

Electric Vehicle Charging Infrastructure

New EV charging infrastructure will play an essential role in supporting the growing EV fleet in California, as installing charging infrastructure in new buildings is significantly less expensive than retrofitting existing buildings.

EV charging infrastructure requirements are subject to CALGreen regulatory standards set forth in Title 24 of the California Code of Regulations. The CALGreen standards include required standards for new developments and two sets of voluntary standards, Tier 1 and Tier 2, that are more ambitious.

Benefits of Adopting at Least CALGreen Code Tier 2 Voluntary Standards Avoid Retrofit Costs

According to the California Air Resources Board (CARB), installing EV charging infrastructure in a new building can save an estimated \$7,000 to \$8,000 per parking space compared with retrofitting it later (CARB 2019).

Increase Equity

Providing access to more Level 2 chargers in the workplace and public locations allows residents of multifamily households with ZEVs to charge more easily, especially if they do not have access to parking at home (BAAQMD 2022).

Maximize GHG-Emission Reductions

Adopting the suggested code changes for a 10 percent EV-Capable requirement for EV charging infrastructure would lead to an estimated total 690,000 to 820,000 metric tons of carbon dioxide equivalent reduction over a 4-year time frame (CARB 2019).

EV Charging Infrastructure Outline

To develop an ordinance that will best support EV adoption, minimize cost impacts, and avoid inequities, it is necessary to understand the different EV charging options. There are three standardized levels of EV charging facilities that provide charging at different rates. These include Level 1, Level 2, and Level 3 chargers, summarized in [Table 3](#).

Table 3 EV Charging Levels

Type of Charger	Voltage Required (Volts)	Charge per Hour (Miles)	Estimated Time for Full Charge (Hours)	Typical Land Use Type
Level 1	120	3-6	8-12	Residential
Level 2	208-240	14-35	3-4	Residential, Commercial
Level 3, DC Fast Chargers	200-600	80-600	0.5-0.75	Commercial (e.g., offices)

Type of Charger	Voltage Required (Volts)	Average Power (Kilowatts) – Each EV Charger	Estimated Time for Full Charge (Hours)	Typical Land Use Type
Level 1	120 (source) AC Circuit	2* (2000 Watts)	14-16	Residential
Level 2	208-240 (source) AC Circuit	6-8**/** (6000-8000 Watts)	6-10*****	Residential, Commercial
Level 3, DC Fast Chargers	480 (source) 200-600-800 V DC out	150, 250, 350, 500 & up**** (150,000 to 500,000 Watts)	0.33-0.5	Commercial (e.g., offices)

*Note 1: Level 1 uses just a normal 120 Volts AC (15 to 20 Amp) household outlet, above 20 Amps the circuit trips

**Note 2: Level 2 is at least 6000 Watts or 6 KW. Most households will opt to install two Level 2 chargers because they will have more than one EV (Car/Truck or SUV)

***Note 3: Also, regarding Level 2 EV chargers, 6 KW may not seem to be a lot, but in reality here is what happens

- In Glendale, Single Family Homes Typical Loads 6KW to 7 KW with HVAC system – Adding a

Level 2 Charger is like adding a single family home to the grid.

- Hence, adding one to two Level 2 EV chargers (adds 12KW) will increase a Single Family Home loads by a factor of 2x or 3x
- In Glendale, Apartment Home’s typical Loads is about 2KW to 4KW
- Therefore, adding one to two Level 2 EV chargers will increase an Apartment Home’s loads by a factor of 3x or 4x, since most apartments will have one or two parking spots

****Note 4: Original Level 3 chargers were 50KW ... in an effort to charge electric vehicles from 20 % to 80% in 30 minutes or less.

- Today, Level 3 Chargers are 150KW+ (especially for buses or trucks or fleet/commercial)
- Today, (8/2022) Tesla installs Level 3 Chargers (Super Chargers) that are rated 250KW each
- To surpass Tesla, European Automakers and others are installing Level 3 Chargers at 350 KW to 500KW + each

*****Note 5: Charging times vary due to size of the Battery in the EV (Car/Truck/SUV) and State of Charge of the battery when plugged into the charger.

- Currently EVs (Car/Truck/SUV) have batteries rated at 60 KWH to 120+ KWH, Hybrid Plug-ins have batteries that range from single digit size to 20 KWH.
- The level 2 chargers are assumed to be between 24 Amps and 32 Amps AC, at 240 volts which translates roughly into 6 – 8 kW of charging power. For an 80 kW battery going from 15% to 90% is 75% capacity or 60 kW; it will require 8-10 hours to accomplish.

All the above-mentioned chargers place an unprecedented strain on the Electric Power System and GWP’s opinion is that EV Charges will (2X) double the load of the Utility especially from 4 PM to 5 AM daily, as residents and fleets plug in EV vehicles for the night and PV Solar diminishes and disappears for the night. Most home energy storage “power walls” will help for 2 to 4 hours and then may also become a load to recharge to provide back-up power for the homes (they recharge later in the night or wait till morning). **Adding a Level 2 Charger is equivalent to adding a single-family home to the grid. Level 3 (Fast DC chargers) will draw from GWP’s Grid from 150KW to 500KW each.**

EV charging infrastructure requirements are generally described in three terms of completeness, as seen below in [Table 4](#).

Table 4 EV Charging Infrastructure

Type of Space	Infrastructure Included	Infrastructure Not Included	Unique Attributes	Typical Land Use Type
EV-Capable	Parking stall, underground conduit	Charger hardware, wiring, charging plug, charging station	Can be easily converted to charging space, avoids costly future retrofits	Residential
EV-Ready	Parking stall, underground conduit, wiring, wire outlet	Charging plug, charging station	Baseline “Plug and Play” charging station	Residential, Commercial
EV-Installed ⁵ (EVSE)	Parking stall, underground conduit, wiring, wire outlet, charging plug, charging station	N/A	Most advanced and least prevalent space available	Commercial, (e.g., offices and mixed-use lots)

⁵ EV installed charging spaces also referred to as an Electric Vehicle Charging Station or Electric Vehicle Supply Equipment

The City should consider developing EV reach codes specific to varying land use types.

- New One-and Two-Family Homes and Townhomes with Attached Private Garages
- New Multifamily, Hotels, and Motels
- New Non-Residential

It is well documented that limited access to EV charging infrastructure can limit EV adoption and slow progress on GHG reduction. While it may be tempting to require EV infrastructure in some form at every parking location, it is important to other impacts, such as grid capacity and future technology changes, to maximize efficiency while incentivizing EV adoption.

EV Charging: CALGreen Tier 2 Voluntary Standards

- *What types of buildings will be included?*
 - One or Two-Family homes/ Low-rise Multifamily:
 - One *Level 2* (40- to 100-amp breaker on a 208- or 240-volt alternating current (AC Circuit)) EV-Ready space per unit and Level 1 Circuitry ('slow charging').
 - Multifamily, Hotels & Motels:
 - <20 Spaces: 40% of parking spaces must be EV Ready
 - >20 Spaces: 15% of total parking spaces to have Level 2 EVSE (Electric vehicle supply equipment)
 - Other non-residential:
 - Adopt an additional 10% Level 2 EV Charging requirement and 15% Level 2 capable spaces requirement for new non-residential buildings with 10 > spaces
 - CALGreen Tier 2 Voluntary Standards:
 - *1-2 Family Homes + Low-Rise Multifamily: One Level 2 EV-Ready Space/ Unit + Level 1 Circuitry*
 - *Multifamily; Hotels & Motels: 40% of Parking spaces EV ready; >20 units; 15% of total spaces dedicated to EV*

Definitions:

Electric Vehicle Capable Space – A vehicle space with electrical panel space and load capacity to support a branch circuit and necessary raceways, both underground and/or surface mounted, to support EVSE charging.

Electric Vehicle (EV) Ready Space – A vehicle space which is provided with a branch circuit, any necessary raceways, both underground and/or surface mounted, to accommodate EV charging, terminating in a receptacle or a charger.

Electric Vehicle Supply Equipment (EVSE) – the 20 (**low power**) or 40 (**high power**) ampere branch circuit and the EV charging connectors, attachment plugs and all other fittings devices power outlets or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

Note: An EVSE meets the requirement of an EV Ready space (but is more expensive).

Multifamily Base Code

Multifamily **less** than 20 dwelling units; Hotels and Motels **less** than 20 Rooms

- 10 Percent EV Capable
- 25 Percent EV Ready

Multifamily **MORE** than 20 dwelling units; Hotels and Motels **MORE** than 20 Rooms

- 10 Percent EV Capable
- 25 Percent EV Ready
- 5 Percent Level 2 EVSE

Multifamily Tier 2

Multifamily **LESS** than 20 dwelling units; Hotels and Motels **LESS** than 20 Rooms

- 40 Percent EV Ready (low power)

Multifamily **MORE** than 20 dwelling units; Hotels and Motels **MORE** than 20 Rooms

- 40 Percent EV Ready (low power)
- 15 Percent of those 40 must now be Level 2 EVSE (appears to be high or low power)

Non-Residential Base Code

Total number of parking spaces	Number of required EV capable spaces	Number of EVCS (EV capable spaces provided with EVSE) ²
0-9	0	0
10-25	4	0
26-50	8	2
51-75	13	3
76-100	17	4

101-150	25	6
151-200	35	9
201 & more	20% of total ¹	25% of EV capable spaces ¹

¹ Calculation for spaces shall be rounded up to the nearest whole number

² The number of required EVCS (EV capable spaces provided with EVSE) in column 3 count toward the total number of required EV capable spaces shown in column 2

Non Residential Tier 2

Total number of parking spaces	Tier 2 number of required EV capable spaces	Tie 2 number of EVCS (EV capable spaces provided with EVSE)²
0-9	3	0
10-25	8	3
26-50	17	6
51-75	28	9
76-100	40	13
101-150	57	19
151-200	79	26
201 & more	45% of total parking spaces ¹	33% of EV capable spaces ¹

¹ Calculation for spaces shall be rounded up to the nearest whole number

² The number of required EVCS (EV capable spaces provided with EVSE) in column 3 count toward the total number of required EV capable spaces shown in column 2

Existing Building Requirements

Although staff recommends that reach codes for existing buildings be addressed in the City reach code at the next tri-annual California Green Building Code update in 2026, the benefits and drawbacks of including existing buildings in a reach code need consideration. While new construction represents the most straightforward and cost-effective way to ensure buildings electrify, the City of Glendale is mostly built out. A significant portion of emissions come from existing building stock. Therefore, extending PV, energy efficiency, EV, and electrification requirements to retrofits represents an opportunity for the City to further its climate goals. Furthermore, targeting existing buildings already undergoing significant renovations is the most cost-effective time for this work, allowing easy access to building systems and financing, which can significantly increase the project's cost-effectiveness.

The Rincon Memorandum summarizes the EV, PV, and electrification ordinances that have been adopted in California. Rincon has included an approach that utilizes a

scorecard that cities like Piedmont and Carlsbad have adopted to provide a performance-based approach for existing building retrofits.

Retrofit Thresholds

Many reach codes use the term “substantial” remodel or retrofit as a threshold for when a reach code would take effect. A substantial retrofit could be defined in several ways, including the percentage value of the work compared to the building market value or percent of floor area addressed. For example, “substantial” may be defined as a project affecting over 50% of floor area or using a dollar amount to target retrofits. Currently, no cities that specifically require electrification at the time of retrofit could be identified.

EVs

The City of Carlsbad adopted an EV charging requirement for major renovations (see definition above) that requires major renovations to comply with the new construction requirements of their EV ordinance for any new parking that is built as part of the project.

Solar PV

Several cities, including Carlsbad, Piedmont, and Santa Monica, require solar PV installation for major additions.

Existing Building Retrofit Performance Pathway

In addition to the prescriptive approaches for Building Electrification, EVs, and PV listed above, cities have begun adopting performance requirements for existing building retrofits. Due to the many variables associated with existing buildings, it can be challenging to identify specific actions that are cost effective and impactful in all scenarios. A performance pathway solves this issue by providing multiple options for each project to review and choose the best approaches that suit their project. The Local Energy Codes team has recently developed a tool for jurisdictions to create their own performance pathway which, establishes a target score and a menu of individual measures with points weighted by site energy savings.

Concerns

Rincon Consultants have engaged City staff representing Glendale Water and Power and Community Development Building & Safety Division throughout the reach code development process. These tier one stakeholders have provided extensive feedback to the consultants in three critical areas; Staffing and budgets, existing buildings, and the electrical infrastructure required to support the building electrification reach code.

Staff has observed an increase in PV and EV submittals before any reach codes adoption. The proposed building electrification reach code is focused on new construction and thus should not increase the number of new projects vis-à-vis non-adoption of a reach code. However, if staff do observe a further increase in submittals due to the adoption of reach codes, an analysis of additional full-time equivalents (FTE) for GWP and Community Development Building & Safety will be necessary to fulfill the needs of the reach code compliance implementation and administration.

For reference, in 2021-2022 new permits issued for new residential and commercial units were as follows:

- Residential 12
- ADUs 164
- Multi-Family 6
- Commercial 2

Rincon Consultants met with GWP to discuss the proposed reach codes and respond to any specific questions regarding the impact on the City’s electrical transmission and distribution infrastructure. As the momentum toward electrifying transportation and the built environment grows, the Electric Utilities will become the “Refineries, the Gas Stations, and the Gas Companies”. Although the proposed reach code is focused on new construction, GWP has to ensure the energy infrastructure is in place to support the electrification transition. It is anticipated that electrification will eventually double GWP’s load in the next 10-20 years. And, compared to peers (utilities) GWP does not have internal generation resources to feed future loads.

Grid Considerations

As EVs and charging technologies advance, charging times are decreasing. Faster charging times mean more electricity is entering the car's battery in a shorter time, meaning more strain on the grid and potentially the need for new grid infrastructure when high levels of charging occur simultaneously. Furthermore, having more EVs and faster chargers means more vehicles can cycle through fewer charging stations and exhibit more strain on the electrical grid. New demands placed on existing electrical infrastructure should be carefully reviewed and incorporated into community planning efforts. In addition, as a result of these new demands placed on the grid, additional considerations should be made to increase electrical infrastructure in certain parts of the City, where applicable.

Other considerations for the proposed reach code to consider are:

1. Most California Cities that passed electrification codes are independent of the (IOU) Utilities, hence they are not affected by reach codes being associated with the Utility. Municipal Utilities will be associated with the reach codes and expectations for assistance/services. Customers may expect assistance such as subsidizing all or portions of the ordinance requirements.
2. The expectation that GWP/City Staff will assist the Public in all planning and permitting aspects of the electrification process.
3. As the momentum toward electrification of transportation and buildings gathers pace the utility infrastructure will require investment to meet this demand.

STAKEHOLDERS/OUTREACH

The Sustainability Office, in partnership with Rincon, has embarked on a stakeholder outreach program. This program has focused on internal stakeholders and external stakeholders as described below:

Internal stakeholders: An internal working group was established to provide feedback to Rincon Consultants, Inc. on the proposed Reach Code ordinance. The internal group consists of representatives from Glendale Water and Power, Community Development, and the Sustainability Office. The meeting consists of a bi-monthly check-in with Rincon. A special meeting with Rincon and GWP was held to discuss matters specific to GWP.

External Stakeholders: The Sustainability office has been holding bi-monthly meetings with the Glendale Building Electrification Working Group (GBWEG). The GBWEG is interested in advancing building electrification in local Communities.

On August 25, 2022, Rincon and the City of Glendale hosted an open webinar to review the City's approach to the reach codes and to discuss potential concerns and issues. The webinar was attended by 24 stakeholders including Glendale residents, building professionals and environmental organizations.

On September 1, 2022, staff met with the Sustainability Commission to receive feedback on the City's proposed approach to the reach codes. The Sustainability Commission unanimously moved to recommend that the City Council direct staff to proceed with preparation of a reach code for Building Electrification, PV, and EV. The Sustainability Commission made the following specific recommendations regarding the reach code:

- Building Electrification: Require all new electric construction. Allow for applicants to apply for an infeasibility waiver, with infeasibility to be limited to situations where compliance is physically infeasible. Staff to report back to the Sustainability Commission within one year of implementation of the reach code

regarding the number and type of infeasibility waivers that have been sought or granted pertaining to the building electrification requirement.

- PV: For non-residential and high-rise multi-family properties, require installation of PV to at a minimum offset 50% of projected electricity use or cover at least 50% of roof space. Allow applicants to apply for an infeasibility waiver, with infeasibility to be limited to situations where compliance is physically infeasible.
- EV: Adopt CalGreen Tier 2 Standards for EV Charging, with the following additional requirements:
 - For new multi-family residential properties, 100% of parking spaces to be electric vehicle capable.
 - For non-residential properties, the EV-readiness standards shall be double those required by the CalGreen Tier 2 Standards.
 - For new multi-family residential and non-residential properties, at least 20% of each such property's parking spaces must have Level 2 EVSE installed.
- Existing buildings: Remodels of existing buildings were not recommended to be included in this reach code. However, the Sustainability Commission recommended that the City Council direct staff to move expeditiously towards amending the reach code requirements for Building Electrification, PV, and EV to apply them to existing buildings undergoing a major remodel. The Sustainability Commission recommended that efforts to add existing buildings to the reach code requirements begin in 2023 and to be implemented as soon as possible, ideally in 2024 and before the next State Building Code update. Staff to research best practices and methods for defining what constitutes, and how to define, a major remodel triggering reach code requirements.

During the week of September 5-10 staff will host two Roundtables. One will be focused on building professionals, and one will be focused on community groups. These roundtables will provide an opportunity to have a more in-depth discussion with interested parties.

FISCAL IMPACT

There is no fiscal impact associated with this report. The fiscal impacts of the reach code itself, if adopted, including the cost of any additional staffing or necessary upgrades to GWP infrastructure, are not included in this report.

ENVIRONMENTAL REVIEW (CEQA/NEPA)

This item is exempt from the requirements of the California Environmental Quality Act (CEQA) as it is not a project approval.

CAMPAIGN DISCLOSURE

This item is exempt from campaign disclosure requirements.

ALTERNATIVES

Alternative 1: Recommend that City Council provide directions on options to be included in a Reach Code for 1. Building Electrification – all electric new construction and infeasibility waiver, 2. Photovoltaic (PV) 50% energy offset OR roof area PV array and to amend Title 24 of the California Building Code or adopt an amendment to the Glendale Municipal Code and defer adopting the Electric Vehicle (EV) Reach Code.

Alternative 2: Recommend that City Council provide direction on options to be included in a Reach Code for 1. Building Electrification – all electric new construction and infeasibility waiver, 2. Photovoltaic (PV) 50% energy offset OR roof area PV array and 3. CalGreen Tier 2 Standards for Electric Vehicle (EV) Charging to amend Title 24 of the California Building Code or adopt an amendment to the Glendale Municipal Code.

Alternative 3: City Council not to adopt a reach code to amend title 24 of the California Building Code or adopt an amendment to the Glendale Municipal Code.

Alternative 3: The City Council may consider any other alternative not proposed by staff.

ADMINISTRATIVE ACTION

Prepared by:

David Jones, Sustainability Officer

Approved by:

Roubik R. Golanian, P.E., City Manager

EXHIBITS/ATTACHMENTS

1. June 22, 2022 memorandum of Rincon Consultants, Inc. regarding Building Electrification, Photovoltaic Infrastructure, and Electric Vehicle Charger Building Code Information & Recommendations for the City of Glendale.