

1. Adopt an Ordinance that requires the following:
 - a. Newly constructed buildings three stories or less with a building permit filed on or after January 1, 2023, to be all-electric buildings;
 - b. Newly constructed buildings four stories or more with a building permit filed on or after January 1, 2026, to be all electric buildings; and
2. Make certain exceptions for commercial kitchens, process loads for manufacturing facilities, and water heating if net metering is unavailable for affordable housing; and include an additional appeal process for other applicable infeasibility considerations.

BACKGROUND:

On November 17, 2020, the Riverside City Council adopted the Envision Riverside 2025 Strategic Plan which included an ambitious yet achievable goal of reaching citywide carbon neutrality by 2040. This policy is in line with global, federal, and state goals and mandates to combat the current and future impacts of climate change.

The City of Riverside is the twelfth largest City in California and the County Seat of the third most populous County in California. Riverside has long been a leader in the sustainability arena and can continue to leverage this branding for economic development efforts, like the effort to bring the State's carbon regulator, The California Air Resources Board (CARB), to move their Southern California Headquarters to Riverside, which is the largest net-zero building in the United States.

On April 22, 2021, the Committee discussed an item introduced by Chair Ronaldo Fierro to discuss strategies related to building decarbonization. The Committee unanimously approved a motion to (1) direct staff to move forward with the discovery phase of a Building Decarbonization Reach Code that would include an all-electric mandate for newly constructed buildings three stories or less beginning January 1, 2023; and (2) form a Decarbonization Advisory Group (DAG) made up of representatives from the development community, organized labor, environmental justice and community groups, and other industry experts to inform the development of a reach code.

The DAG included membership of The Building Industry Association, The California Apartments Association, The Greater Riverside Chamber of Commerce, The Inland Association of Realtors, The Inland Empire Labor Council, The Riverside San Bernardino Building Trades Council, The Sierra Club, 350 Riverside, Electrify Riverside, Riverside Neighborhood Partnership, Southern California Edison, and the Southern California Gas Company.

Between July 2021 and May 2022, the DAG held eight meetings and heard from a wide array of technical experts, including representatives from the California Energy Commission, the American Institute of Architects, the California Building Industry Association and Southern California Gas Company, among many others, including key staff from the City Manager's Office, Riverside Public Utilities and the Community & Economic Development Department. The DAG largely agreed that electrifying and decarbonizing new low-rise buildings (three stories or less) starting with the 2023 triennial building code cycle is an essential step towards achieving our carbon neutrality goals in accordance with the Strategic Plan.

The DAG discussions revolved heavily around housing affordability, the cost of electricity, the impact of an increased load on the electric grid, the cost of infrastructure upgrades, and market

readiness of all-electric appliances. These issues were researched and are fully addressed within this report.

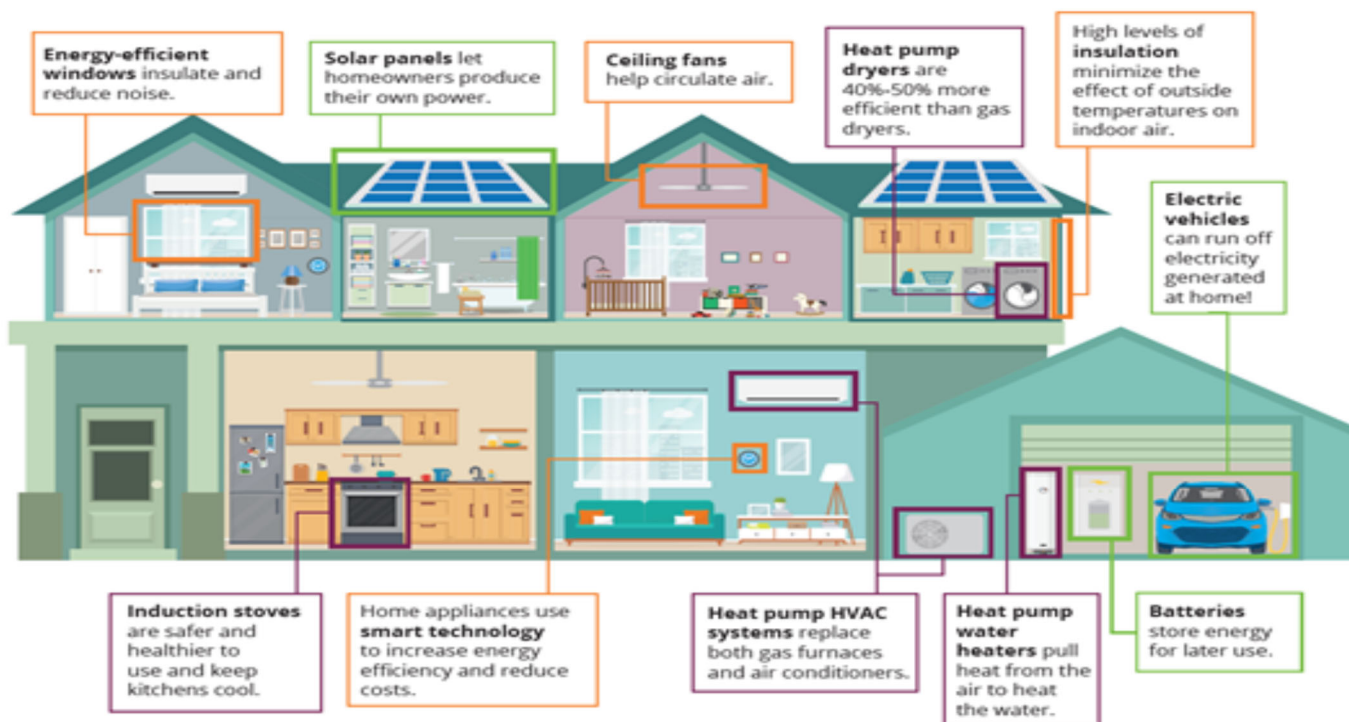
On June 23, 2022, The Office of Councilmember Fierro presented the findings of the Decarbonization Advisory Group along with a Building Decarbonization Reach Code framework to the full Committee for discussion. The outcome of the meeting resulted in a unanimous recommendation to move forward with a proposed Ordinance for City Council consideration during the forthcoming triennial code update in the fall of 2022. Staff was also directed to commence a series of public outreach workshops to discuss a draft ordinance of the proposal and receive feedback from the community to help refine the technical requirements and exceptions therein.

Thereafter, between August 2022 and October 2022, staff hosted three public workshops throughout the City while also presenting to the Greater Riverside Chambers of Commerce Economic Development Council on three occasions. The workshops were successful in providing additional feedback from both residents and the business community, ultimately expanding the list of exceptions included within the Ordinance while vetting its cost-effectiveness.

DISCUSSION:

Building Electrification

Building electrification, or “building decarbonization,” refers to the process of phasing out gas infrastructure utilized for cooking and heating in buildings – which are powered by fossil fuels – and instead transitioning to the use of electricity – mainly powered by solar, wind, and other sources of zero-carbon electricity.



Cost Effectiveness for New Construction

All-electric buildings have proven to be cost-effective for new construction for nearly all building types since most electric appliances have similar or lower operating costs compared to natural gas

appliances. All-electric homes can be cheaper to construct than traditional homes. California homeowners could save an additional \$1,500 upfront and hundreds of dollars annually with the installation of electric heat pumps instead of gas furnaces in new construction. However, the alternative of retrofitting can require significant and costly upfront investments.

The 2022 California Energy Codes and Standards Program Custom Cost Effectiveness Analysis (Analysis) for the City of Riverside found that newly constructed all-electric homes are cost-effective based on both on-bill¹ and time-dependent valuation methods.² Additionally, the 2019 Cost Effectiveness Study for Low Rise Residential New Construction for Climate Zone 10 (which includes Riverside) affirmed that all-electric requirements are cost-effective both to build and in operating costs for multi-family residential. However, the 2022 Analysis noted that new Accessory Dwelling Units (ADU's) constructed on properties with existing mixed fuel buildings was not on-bill cost-effective for property owners at this time which brought forward consideration to include an exception in the Ordinance to continue to facilitate affordable housing in our communities.

A California Air Resources Board report found that by electrifying heating, ventilation, and air conditioning (HVAC) and water heating systems in existing homes, bill savings can be up to \$750 per year in single-family homes and up to \$300 per year in low-rise multifamily buildings. Retrofitting existing residential buildings with electric end uses has the potential to reduce GHG emissions by about 30-60% compared to mixed-fuel homes.

Early implementation of building electrification will provide cost-savings to developers, builders, and eventual tenants and homeowners in the long run.³ An earlier effective date will also avoid the construction of “stranded assets” (obsolete gas infrastructure) that will eventually require retrofitting once federal and state mandates go into effect.

While natural gas currently plays an integral role in California's energy grid (80% of all California homes are connected to the natural gas grid) – consumer behavior is shifting as customers wean off gas usage and federal and state climate mandates come into play, causing large reductions in gas demand across the State of California over the next ten years. Over time, as costs become reliant on a decreased ratepayer base, unsustainable increases in gas rates will become inevitable.

Without policy intervention, a small share of ratepayers, mainly low-income residents and renters, will be forced to bear the brunt of increased gas costs. The Energy and Environmental Economics (E3) Group, a highly reputable nonpartisan energy firm found that given this risk, early implementation of building electrification mandates can serve as a risk-reduction strategy to protect vulnerable communities from increased energy costs.⁴ Electrifying during new construction has been shown to be more cost-effective than implementing electrification readiness as already

¹ Customer-based lifecycle cost approach that values energy based upon estimated site energy uses and customer on bill savings using electricity and natural gas utility rate schedules over a 30-year duration accounting for discount rate and energy cost inflation.

² Energy Commission LCC methodology, which is intended to capture the “societal value or cost” of energy use including long-term projected costs such as the cost of providing energy during peak periods of demand and other societal costs such as projected costs for carbon emissions, as well as grid transmission and distribution impacts. This metric values energy use differently depending on the fuel source (gas, electricity, and propane), time of day, and season. Electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods (Horii et al., 2014). This is the methodology used by the Energy Commission in evaluating cost-effectiveness for efficiency measures in Title 24, Part 6

³ Mahone, A., Li, C., Subin, Z., Sontag, M., Mantegna, G. (2019). Residential Building Electrification in California: Consumer economics, greenhouse gases, and grid impacts. Energy and Environmental Economics, Inc.

⁴ Mahone, A., Subin, Z., Kahn-Lang, J., Allen, D., Li, V., De Moor, G., . . . Price, S. (2018). Deep Decarbonization in a High Renewables Future: Updated Results from the California PATHWAYS Model. California Energy Commission.

required by the 2022 Building Standards Code Update.

Improves Indoor Public Health

In addition to the emission impacts of transitioning away from gas to electrification, research has shown significant public health benefits to the transition to electrification. According to a study conducted by the UCLA Fielding School of Public Health, replacing all of California's gas appliances with electric appliances would prevent 900 cases of respiratory illnesses, lower health care costs by \$3.5 billion, and save 350 lives every year.⁵ These co-benefits make building electrification a highly compelling strategy for emissions reductions, especially compared with alternatives that rely on higher levels of combustion.

According to the study, cooking with gas appliances for over an hour can cause carbon monoxide and nitrogen dioxide levels to increase above the acute national and state-based ambient air quality thresholds in over 90% of scenarios modeled by the research team. It was also found that those concentrations are the highest for those that live in apartments due to the smaller space of the residency. A 2013 study in the International Journal of Epidemiology showed that living in a home with gas cooking increased children's chance of having asthma by 42%.

Utility Readiness

Riverside Public Utilities (RPU) provides electricity to almost all properties in the City. RPU estimates a small incremental electrical demand increase of less than 2% per year due to the proposed Building Decarbonization Ordinance and which may be lower if the load is offset by a customer's choice for on-site generation or the increased efficiency of appliances and equipment. As with all load growth, RPU will procure additional generation or purchase electricity from the California electricity market from generation resources that are the lowest cost available. The new generation resources will be incorporated into the mix of generation resources that are provided to all of RPU's customers.

The additional load will also be supported by the Riverside Transmission Reliability Project (RTRP). The RTRP is expected to be completed in 2026. At this time and until the completion of the RTRP, RPU has sufficient capacity and resources available (including through market purchases) to support electricity demand, including the additional electricity demand from the electrification requirement in the proposed Building Decarbonization Ordinance. New buildings increase the electricity load as it is and adding full electrification will be incremental to the already occurring additional new load.

The future electricity grid is being prepared to integrate and fully transition to renewable electricity in the future. This new grid will transition to a mix of renewable generation, battery energy storage, distributed resources, incorporation of energy efficiency, and more. These are evaluated as part of the RPU Integrated Resource Plan - last completed in 2018 and being updated for 2023/2024. RPU, with approval pending⁶, is also planning to develop the Riverside Accelerating Clean Energy by 2040 Study with the National Renewable Energy Lab (a lab owned by the U.S. Department of

⁵ Zhu, Y., Connolly, R., Lin, Y., Mathews, T., & Wang, Z. (n.d.). (rep.). Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California. Los Angeles, CA: UCLA Fielding School of Public Health

⁶ The Riverside Accelerating Clean Energy Project by 2040 project with the National Renewable Energy Laboratory has been recommended for approval by the City Council by the Riverside Board of Public Utilities and the Land Use, Sustainability, and Resilience Committee at their meeting held on October 24, 2022, and November 14, 2022, respectively. The City Council will consider the project at a future meeting.

Energy) that will identify different ways in which RPU will be able to provide electricity that will support not only new building electrification but also existing building electrification and the electrification of the transportation systems in both near and longer-term years.

The statewide energy shortages are a regional concern, and RPU along with the State and all utilities in the state are working to address the potential shortfalls which are occurring during summer peaks. RPU cannot function alone in meeting this need, as it will impact all entities that participate in the California Independent System Operator or CAISO. Regardless of these activities, RPU will ensure that it procures sufficient electricity to serve the City's load, including the all-electric buildings as they develop.

Finally, RPU's interconnection rules will not change. Under the RPU interconnection rules, as developers add new buildings, they will continue to be responsible for connecting to the electric distribution grid and making necessary distribution system upgrades that will support their new load.

Building Decarbonization Ordinance

Building electrification has been identified as a key decarbonization strategy and a critical component of efforts to achieve our emission reduction goals established in the Envision Riverside 2025 Strategic Plan. The City of Riverside would be joining over 60 other California cities and counties that have implemented all-electric Reach Codes. This list of cities includes Pasadena, Santa Barbara, Los Angeles, Oakland, Sacramento, San Jose, and South San Francisco, to name a few.

The Chapter 16.26 addition applies to all newly constructed buildings three stories or less erected in the City, effective January 6, 2023, and includes all uses like residential, commercial, and industrial, with some exceptions. The Ordinance also includes an effective date for all buildings (including those four stories or higher), which would occur during the next triennial code cycle, effective January 1, 2026.

As the City considers equity, cost, and industry readiness, staff has included several additional exceptions to the Ordinance since the last Committee meeting, along with an Infeasibility Waiver Process for unique cases, or for health and safety concerns.

The exceptions include the following:

1. Cooking equipment for commercial kitchens.
2. Water heating (if virtual net metering is unavailable) for regulated affordable housing.
3. Existing building alterations, remodels, changes of use, and additions.
4. Process loads for manufacturing/industrial use equipment and machinery.
5. Newly constructed ADUs/JADUs with existing mixed-fuel primary buildings on site.
6. Emergency operation facilities, when necessary.
7. Outdoor portable propane appliances.
8. Consideration of future availability of alternative zero-carbon fuel sources.

The Infeasibility Waiver Process is included for unusual physical site conditions, commercial availability of electric appliances or equipment, necessary operational requirements, electrical infrastructure requirements, or public health, safety, or general welfare. The Building Official may waive the requirements in writing only for those portions of the building where building electrification

is infeasible. Appeals of the Building Official's determination are permissible in accordance with pre-established procedures outlined in the municipal code.

The proposed Ordinance applies a phased approach to addressing the decarbonization of the City's built environment and is an initial first step to addressing climate change and related public health concerns. Given the evolving industry, the Ordinance also includes a periodic review to help ensure the code is consistent with state and federal regulations and in line with the latest industry trends and readiness for all uses and building types.

Citywide Decarbonization Efforts

Citywide there are many projects, programs and partnerships underway that are designed to decarbonize and move away from energy systems and practices that produce greenhouse gas emissions, including, but not limited to the following:

1. Leadership:
 - A. The City Council approved the Envision Riverside 2025 Strategic Plan, which includes a cross cutting thread of "sustainability and resiliency" and environmental stewardship strategic priority goal 4.6: "Implement the requisite measures to achieve citywide carbon neutrality no later than 2040."
 - B. CARB leads State of California efforts to address global climate change as well as serves as the primary state agency responsible for actions to protect public health from the harmful effects of air pollution. CARB guides the activities of 35 local air pollution control districts and serves as the principal state agency engaged with State of California efforts to decarbonize buildings.
 - C. The City Manager's Office, Office of Sustainability and Community & Economic Development Department will be preparing a Climate Action Plan in conjunction with the forthcoming comprehensive General Plan Update.
 - D. All new buildings at the University of California, Riverside, are prohibited from on-site fossil fuel combustion (e.g., natural gas) for space or water heating in all new buildings and major renovation projects.
 - E. The Riverside Unified School District (RUSD) Board of Education (on February 4, 2021), adopted Resolution No. 2020/21-61 on the issue of climate change "to examine the design and modernization of our campuses moving forward as we consider this growing global problem..."
2. Land Management: Parks, Recreation and Community Services (and other agencies) maintain natural lands; Tree plantings; SAR initiatives
3. Transportation sector (statewide this sector leads GHG emissions at 36.8% of all GHG emissions) –
 - A. Vehicles and Fuel - The City of Riverside has the No. 1 Green Fleet North America (designation by NAFA in 2022); Clean Air Car Share; Electric Vehicles & Infrastructure;
 - B. Partnerships: Grant partnership with Volvo; Innovation Corridor partnership with UCR; RTA Vine Street Mobility Hub
 - C. Other: Gage Canal Trail; Complete Streets Ordinance; Vehicle Miles Traveled thresholds
4. Industrial sector (20% of GHG emissions)
 - A. Water Quality Control Plant Anaerobic Digester – Waste to Energy Recovery
 - B. General Services led Corp Yard includes alternative fuels like hydrogen and EV
 - C. Public Works Organics Waste Recovery Program
5. Electricity sector (16% of GHG emissions)
 - A. RPU electricity power portfolio sourced from 50% non-GHG

- B. Other: RPU's Integrated Resource Plan; Race to 2040 initiative; Alliance for Renewable Clean Hydrogen Energy Systems; National Renewable Energy Lab study proposal
- 6. Agricultural sector (8.6% of GHG emissions) – Northside Ag Innovation Center agri-voltaic public-private partnership with OASIS, etc., funded by California and US Congress
- 7. Commercial & Residential sector (10.5% of GHG emissions) – **subject Building Electrification Ordinance consideration**; Cal Energy & Green Code adoption (effective 1-1-2023); LEAD Building Certification (CARB; UCR North; Kaiser Tower Expansion)
- 8. Neighborhood Initiatives, Grants and Projects: \$30M Transformative Climate Communities Grant – Eastside Climate Collaborative

Several endeavors listed above also include efforts to sequester carbon, store carbon and/or reduce our per capita carbon footprint.

The Public Utilities General Manager concurs with the recommendations in this report.

STRATEGIC PLAN ALIGNMENT:

This item contributes to the following Strategic Priorities and Goals:

Strategic Priority 2 – Community Well-Being and **Goal 2.4** – Supports programs and innovations that enhance community safety, encourage neighborhood engagement, and build public trust, and **Goal 2.6** - Strengthens community preparedness for emergencies to ensure effective response and recovery.

Strategic Priority 4 – Environmental Stewardship and **Goal 4.6** – Implements the requisite measures to achieve citywide carbon neutrality no later than 2040.

Strategic Priority 5 – High Performing Government and **Goal 5.5** - Fosters a culture of safety, well-being, resilience, sustainability, diversity, and inclusion across the city organization.

This item aligns with each of the five Cross-Cutting Threads as follows:

1. **Community Trust** – The Building Decarbonization Ordinance is transparent and includes community engagement through various workshops and public meetings, including the Economic Development, Place Making, Branding/Marketing Committee, and the City Council which serve the public interest.
2. **Equity** – The Building Decarbonization Ordinance represents a consistent, fair, and impartial application of applicable laws and adopted building standards with equitable distribution of services to the entire community.
3. **Fiscal Responsibility** – The Building Decarbonization Ordinance is neutral towards this cross-cutting thread.
4. **Innovation** – The Building Decarbonization Ordinance implements new building standards that improve means and methods of construction, enable the latest engineering practices, life safety measures, and allows new innovations that help improve and strengthen the City's built environment.

5. Sustainability and Resiliency – The Building Decarbonization Ordinance includes the latest building standards that advance a carbon neutral, clean, green economy and facilitates sustainability and resiliency within the built environment through the Ordinance and updated green, building, fire and energy codes.

FISCAL IMPACT:

There is no fiscal impact associated with this report.

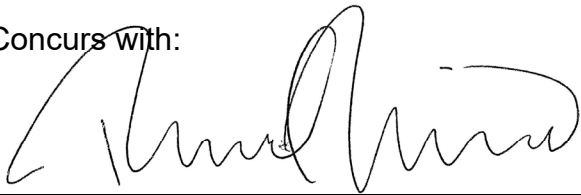
Prepared by: Chris Christopoulos, Acting Community & Economic Development Director
Tracy Sato, Power Resources Manager, Riverside Public Utilities
Caleb Ragan, Office of Councilmember Fierro

Certified as to availability of funds: Edward Enriquez, Interim Assistant City Manager/Chief Financial Officer/City Treasurer

Approved by: Rafael Guzman, Assistant City Manager

Approved as to form: Phaedra A. Norton, City Attorney

Concurs with:



Ronaldo Fierro, Chair
Economic Development, Placemaking, Branding/Marketing Committee

Attachments:

1. EDC Staff Report – April 22, 2021
2. EDC Minutes – April 22, 2021
3. DAG Group Membership
4. DAG Meetings Summary
5. EDC Staff Report – June 23, 2022
6. EDC Minutes – June 23, 2022
7. 2022 Cost Effectiveness Custom Analysis for City of Riverside
8. Energy + Environmental Economics (E3): Residential Building Electrification in California; Consumer economics, greenhouse gases and grid impacts
9. UCLA Fielding School of Public Health Report: Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California
10. List – Cities with Building Electrification Ordinances/Reach Codes
11. Ordinance - Chapter 16.26
12. Exhibit A - Chapter 16.26
13. Presentation