

# 2023 INTEGRATED RESOURCE PLAN

---

## Riverside Public Utilities

### Community Meetings

# WHAT IS AN INTEGRATED RESOURCE PLAN (IRP)?

This IRP will be used to help guide our future decision-making process as RPU plans to meet its forecasted annual peak and energy demand while systematically reducing its GHG emissions, using a combination of current and new supply-side and demand-side resources.

A well-developed IRP will:

1. Analyze and evaluate both supply-side and demand-side resources
2. Identify one or more “least-cost, least-risk” solution(s) for meeting future load serving needs
3. Address all CA SB 350 requirements and CEC specified topics
4. Propose environmentally sound / financially sustainable procurement strategies



# SB 350 IRP COMPLIANCE MANDATE

1. Senate Bill 350 requires that POU's develop IRPs to achieve their share of the electric sector's GHG emissions reduction target. IRPs must be updated, approved, and adopted on at least a 5-year cycle.
2. IRPs must address multiple topics specified in the CEC's POU IRP Submission and Review Guidelines
  - a) Demand (Load) Forecasts
  - b) Energy Efficiency & Demand Side Management Programs
  - c) Future Resource Procurement Plans (including future Capacity requirements)
  - d) Current & Future Greenhouse Gas Emissions
  - e) Distributed Energy Resources (including DER Impacts on the Distribution System)
  - f) Transportation Electrification
  - g) Retail Rates
  - h) Localized Air Pollutants and Disadvantaged Communities



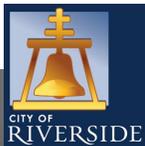
# 2023 RPU IRP: PRIMARY GOALS

1. Identify and assess a cost-effective means for RPU to meet the 60% RPS target by 2030 and successfully achieve a zero-carbon portfolio by 2040. (Note: RPU is already on track to exceed its 60% by 2030 RPS target three years ahead of schedule.)
2. Identify and assess a cost-effective means for RPU to reduce its GHG emissions, such that the utility can meet or exceed its specified share of the electric sector's 2030 GHG emission target. (Note: RPU is already on track to get below its 2030 GHG emission target on a Retail Sales basis.)
3. Address and adequately satisfy all other CEC-required topics as specified in the CEC's IRP Submission and Review Guidelines.

# IRP: DOCUMENT OVERVIEW & STRUCTURE

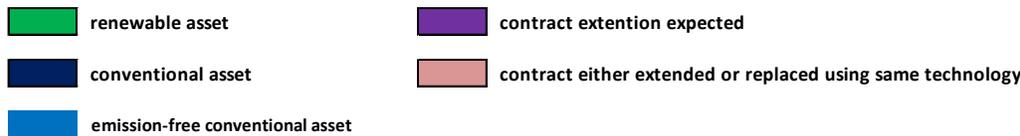
- Chapter 1: Introduction
- Chapter 2: RPU System Load & Peak Demand Forecasts
- Chapter 3: RPU Generation & Transmission Resources
- Chapter 4: RPU Existing Electric System
- Chapter 5: Important Legislative & Regulatory Mandates & CAISO Initiatives
- Chapter 6: Demand Side Management: Energy Efficiency, Fuel Substitution, and DR Resources
- Chapter 7: Market Fundamentals
- Chapter 8: Intermediate Term (Five-Year Forward) Power Resource Forecasts
- Chapter 9: GHG Emission Targets & Forecasts
- Chapter 10: Future Resource Adequacy Capacity Needs
- Chapter 11: Modeling Assumptions for Current and Future Generation Resources
- Chapter 12: Long Term Portfolio Analyses
- Chapter 13: Distribution System Studies of Distributed Energy Resource Impacts
- Chapter 14: Evaluating the Impact of Increasing Energy Efficiency Program Targets
- Chapter 15: Retail Rate Design
- Chapter 16: Transportation Electrification
- Chapter 17: Minimizing Localized Air Pollutants and Greenhouse Gas Emissions in Disadvantaged Communities
- Chapter 18: Potential Future Studies
- Chapter 19: Conclusion

1. 19 Chapters, 3 Appendices, ~ 330 pages.
2. Produced internally by Power Resources staff.
3. Responsive to all CEC requirements.
4. Incorporates added analyses & discussions pertinent to RPU's mid-range and long-range planning efforts.

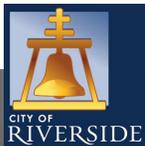


# RPU: CURRENT PORTFOLIO OF RESOURCES

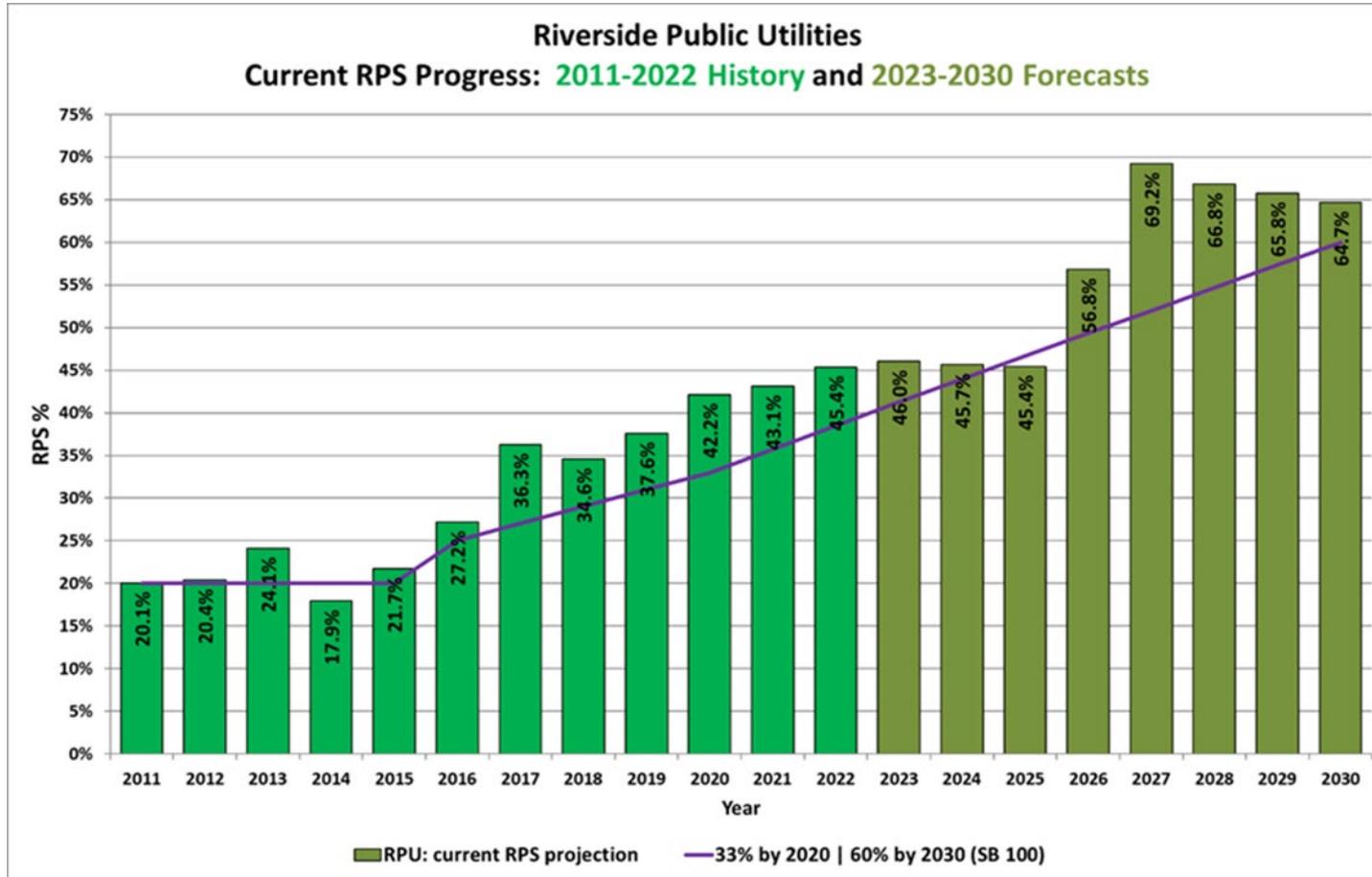
Resources	Name Plate (MW)	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
		<b>Renewable</b>																			
<b>Solar</b>																					
AP North Lake	20																				
Summer	10																				
Antelope Big Sky Ranch	10																				
Tequesquite	7.3																				
Kingbird B	14																				
Antelope DSR	25																				
Columbia II	11																				
<b>Geothermal</b>																					
CalEnergy	86																				
Coso	10/30																				
<b>Wind</b>																					
Cabazon	25																				
Wintec	1.3																				
WKN	6																				
Pattern/SunZia	125																				
<b>Emission Free</b>																					
<b>Large Hydro &amp; Nuclear</b>																					
Hoover Dam	18-28																				
Palo Verde Nuclear	12																				
<b>Conventional</b>																					
<b>Coal</b>																					
Intermountain (IPP)	136																				
coal units decommissioned after 2025, replaced by CCNG asset, RPU exits contract after 2027																					
<b>Natural Gas</b>																					
Clearwater	28.5																				
RERC 1-4	194																				
Springs	36																				
IPP CCNG	64																				
RPU exits contract after 2027																					



- 7 Solar PV projects
- 2 Geothermal portfolios
- 4 Wind projects
  
- Hoover Dam
- Palo Verde Nuclear
  
- IPP Coal (ends in 2025)
- IPP CCNG (ends in 2027)
  
- RERC Internal Gen
- Springs Internal Gen
- Clearwater Cogen



# RPS PROGRESS



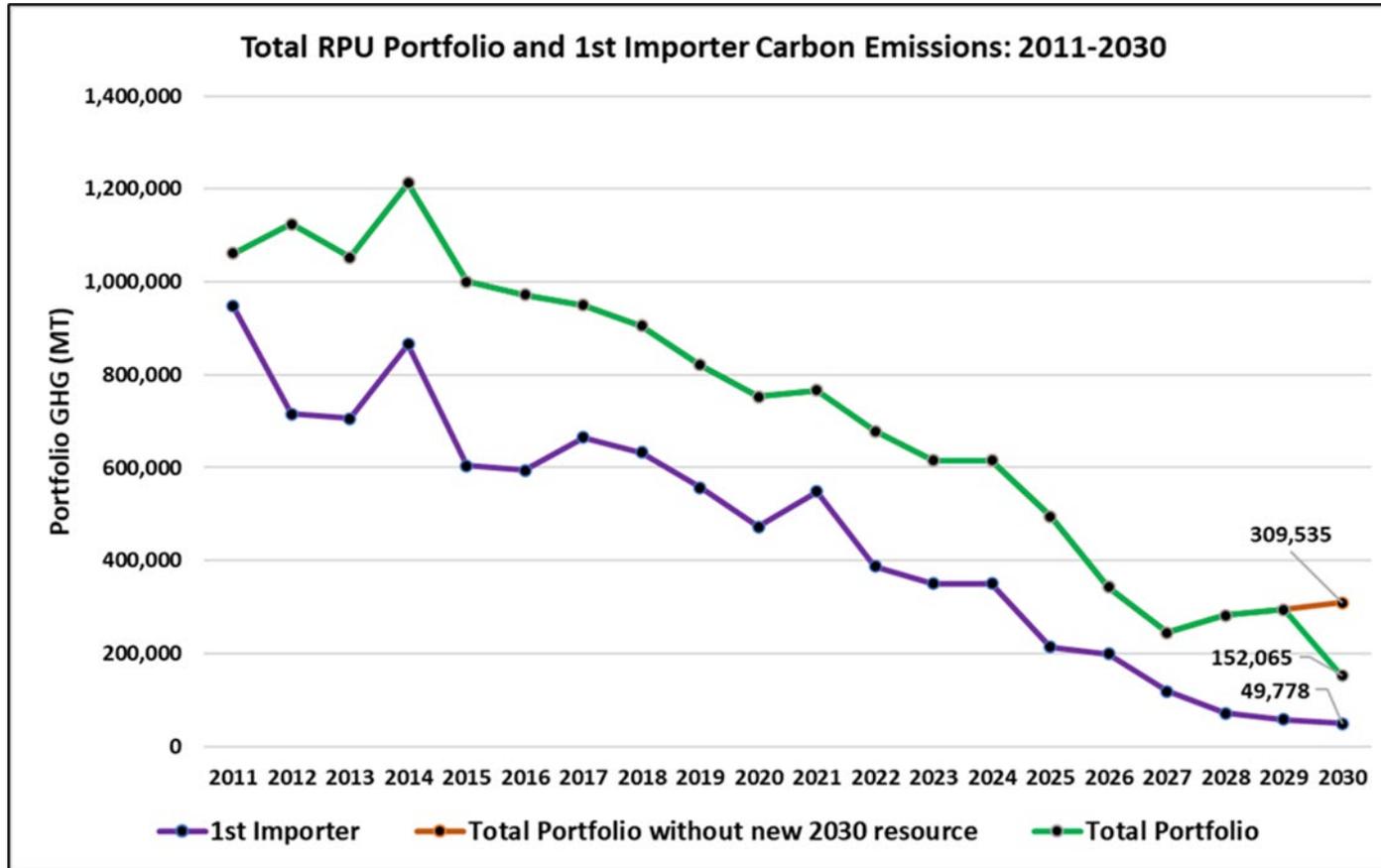
- RPU can meet current RPS requirements through 2030 with its current portfolio of renewable resources.
- Beyond 2030, RPU will need to procure new renewable and/or carbon-free resources to achieve our carbon neutrality milestone dates:
  - Riverside 2025 Plan: 2040
  - SB 100: 2045

# GHG EMISSION TARGETS

- **There are two types of GHG emissions discussed in this 2023 IRP:**
  - 1<sup>st</sup> Importer Emissions (RPU is directly responsible for these & must surrender CARB GHG auction instruments to abate)
  - Total Portfolio Emissions (estimated emissions for total Retail Sales, shown on Power Content Label)
- **Reducing RPU's GHG emissions to achieve emission targets is a primary focus of this 2023 IRP**
  - Two RPU GHG planning targets have been specified by CARB for RPU:

GHG Planning Target	Description	MT CO2-e Emission Value
38 MMT Sector Goal	Official RPU target	349,000
30 MMT Sector Goal	More aggressive GHG reduction scenario	275,000

# GHG PROGRESS

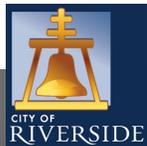


- RPU should get below its official GHG target of 349,000 MT with its current resource portfolio (on a Retail Sales basis).
- RPU can get below the more aggressive GHG target of 275,000 MT by adding one additional renewable resource by 2030 (as contemplated in our 2023 IRP).

# CARBON-FREE ENERGY PROCUREMENT STRATEGY

New Renewable/Carbon-free Resources	COD	Annual MWh
1a. 50 MW Baseload Geothermal Resource (84% CF)	2030	367,920
1b. 120 MW Solar PV (35% CF) + 50 MW / 200 MWh BESS	2030	367,920
2. Baseload Resource Tranche (90% CF)		
• 50 MW	2034	394,200
• 60 MW	2038	473,040
• 20 MW	2043	157,680
3. 75 MW Solar PV (35% CF)	2037	229,950
4. 75 MW Solar PV (35% CF)	2041	229,950

- Proposed new renewable/carbon-free resource contracts for 2030-2045.
- Resource 1a & 1b were analyzed/compared to determine which would be the most cost effective for RPU's portfolio.

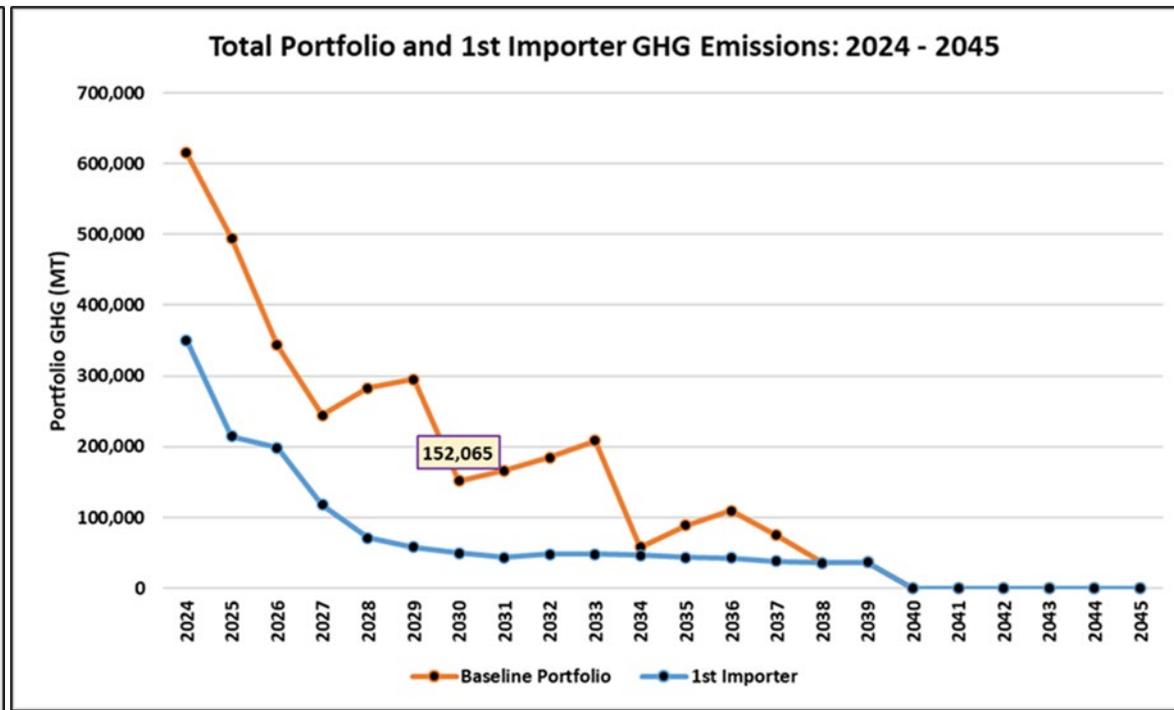
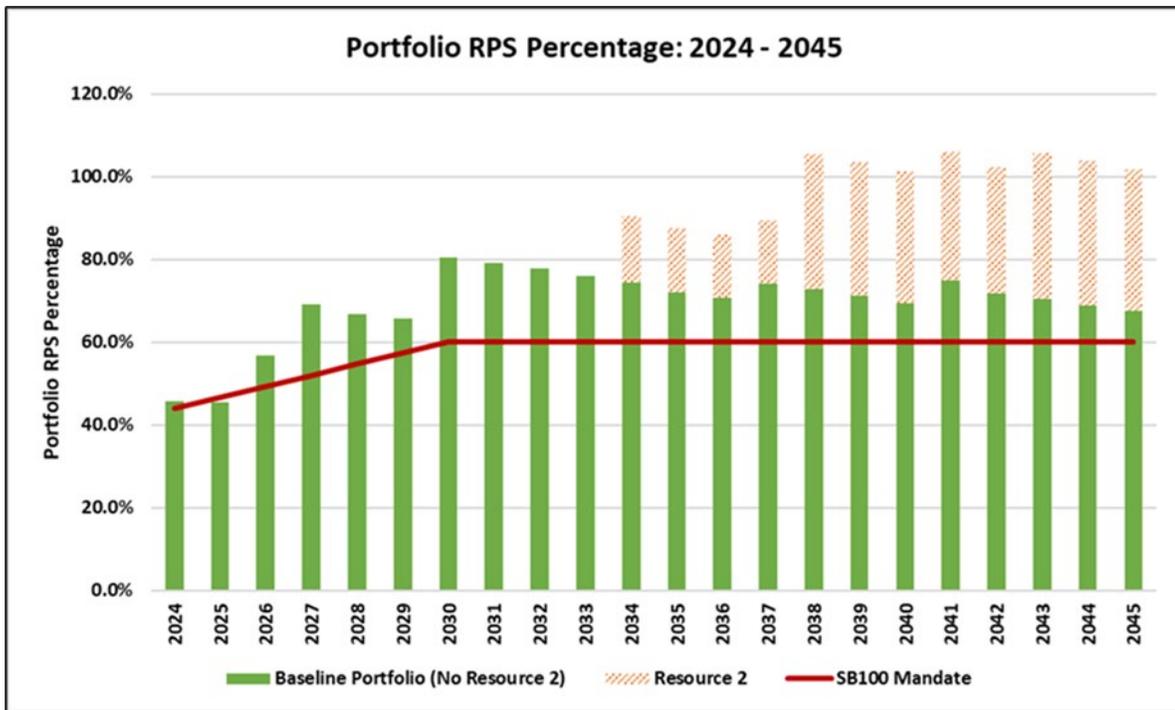


# SPRINGS & RERC REPLACEMENT STRATEGY

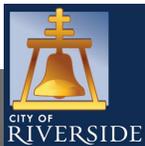
New Resource	Resource Description	COD
Springs 4-hr BESS I	18 MW / 72 MWh BESS	2028
Springs 4-hr BESS II	18 MW / 72 MWh BESS	2030
RERC 4-hr BESS	100 MW / 400 MWh BESS	2035 or 2040
RERC 6-hr BESS	100 MW / 600 MWh BESS	2035 or 2040

- Additionally, another replacement option studied for RERC has it switching to run on biogas starting January 1, 2035, through its assumed retirement on December 31, 2039.

# FORECASTED FUTURE RPS & GHG LEVELS



- Under either Baseline (1a or 1b) Portfolio, RPU exceeds a 60% RPS through 2045 even if the Baseload Tranche (Resource 2) is carbon-free but not renewable.
- Under either Baseline (1a or 1b) Portfolio, RPU achieves a carbon free portfolio by 2040 and maintains it through 2045.



# KEY FINDINGS: LONG-TERM RESULTS

- Geothermal vs Solar PV + Battery Energy Storage (BES): preference will depend on PPA price points – and possibly also BES MW capacity level.
- Under mid-point pricing assumptions for all new resources, power supply costs increase by ~2% annually (through 2045).
- Proposed resource portfolio satisfies all CA RPS mandates & CA/Riverside GHG targets; carbon-free portfolio achieved by 2040.
- Springs units should be replaced with BES as soon as generation units reach end-of-life.
- RERC units should also be replaced with BES when generation units reach end-of-life. However, all early (2035) replacement options result in higher power supply costs.
- Future portfolio costs will be sensitive to new resource price points, regardless of the underlying technology.

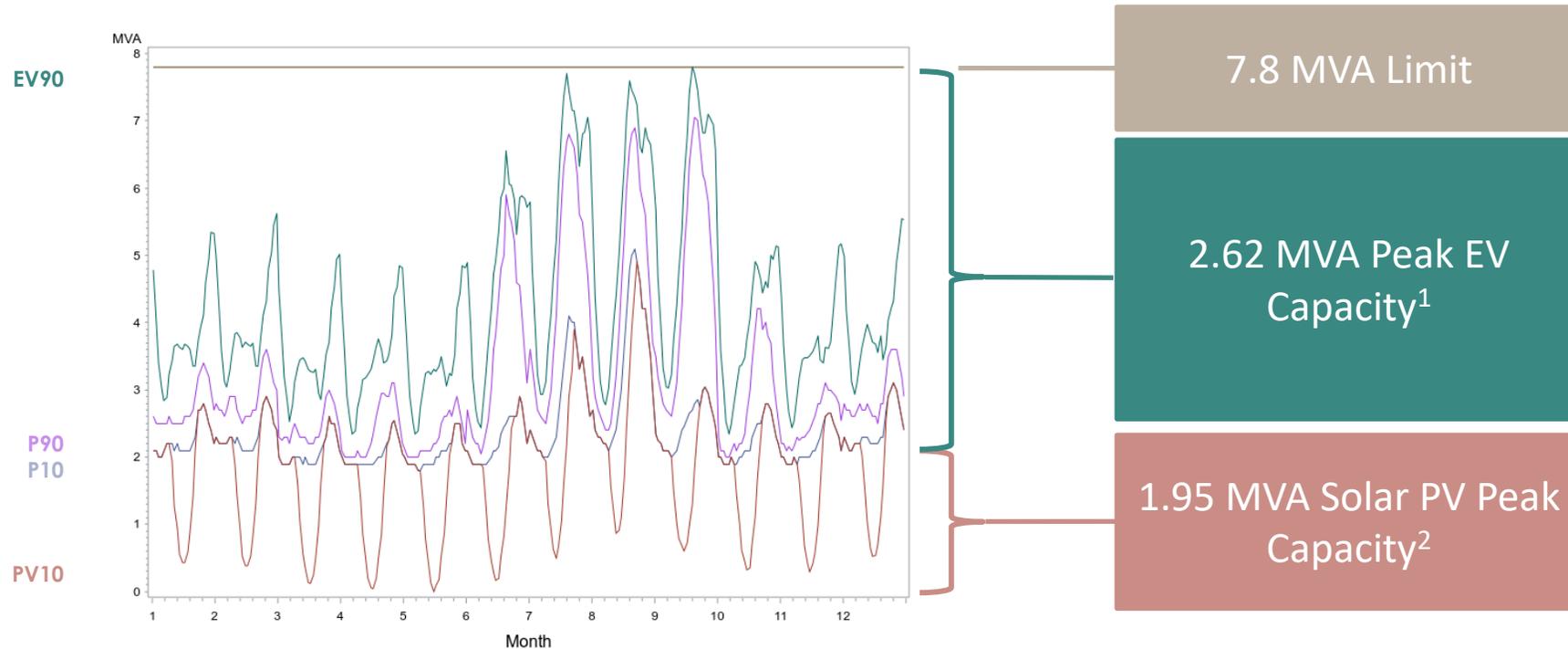
# DISTRIBUTION SYSTEM STUDIES: DER IMPACTS

Staff completed a systemwide sensitivity study of DER impacts to the distribution grid by:

1. Establishing average hourly seasonal and diurnal loading profiles for all distribution circuits, along with their 80% confidence interval (P10-P90).
2. Comparing results from (1) and existing distribution infrastructure capacities against impacts of simulated additions of EV load, fuel switching (building electrification), and PV Generation.
3. Summarizing results from (2) using various sensitivity metrics.

# INTEGRATED CAPACITY ANALYSIS OF EV AND PV IMPACTS

## Example of PV EV Analysis: Harvey Lynn Circuit 1295

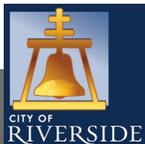


1. 442 to 2,678 light-duty EVs with 11.5kW (Level 2) and 1.9kW (Level 1) charging charging, respectively.
2. 270 to 432 Solar PV systems sized 8kW to 5kW, respectively.

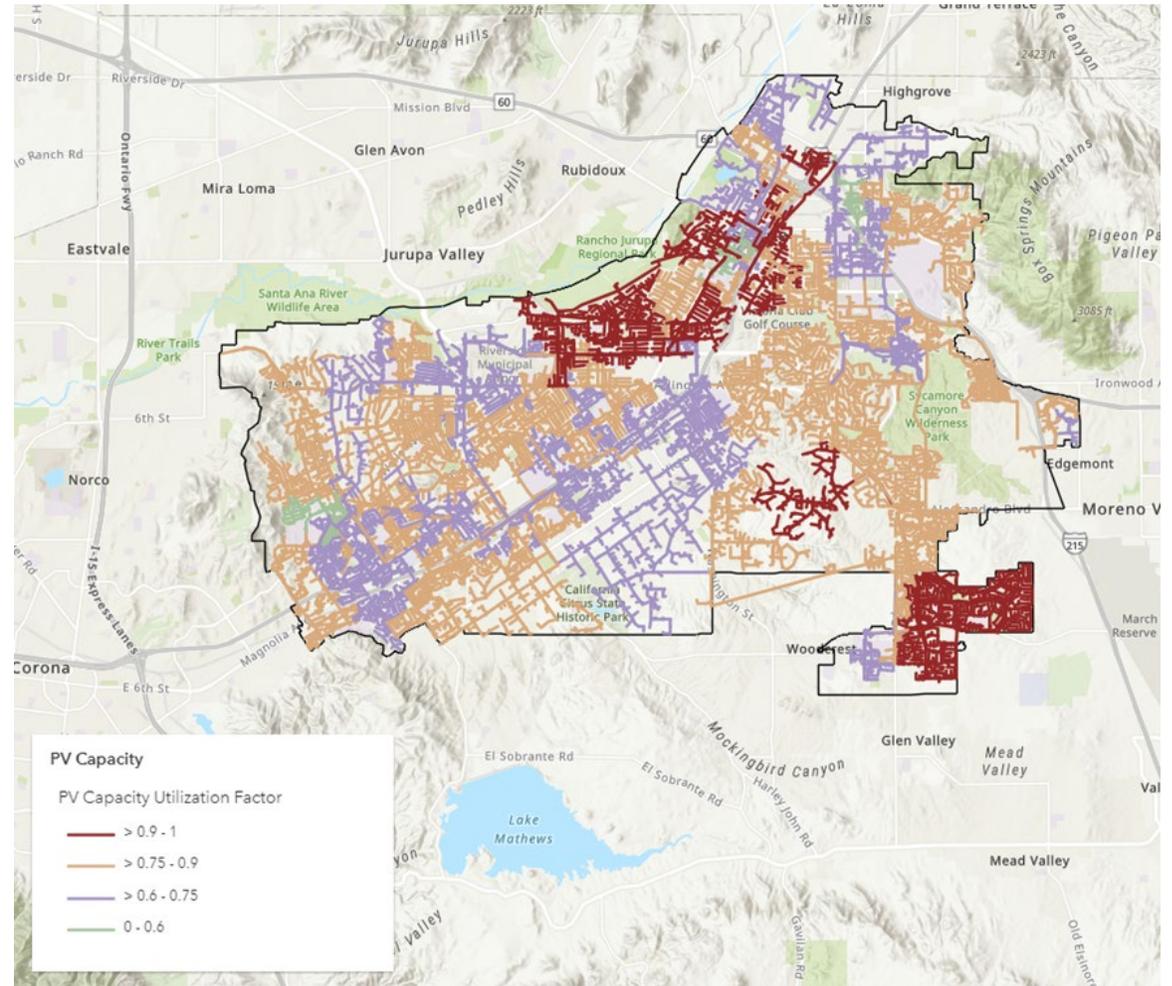
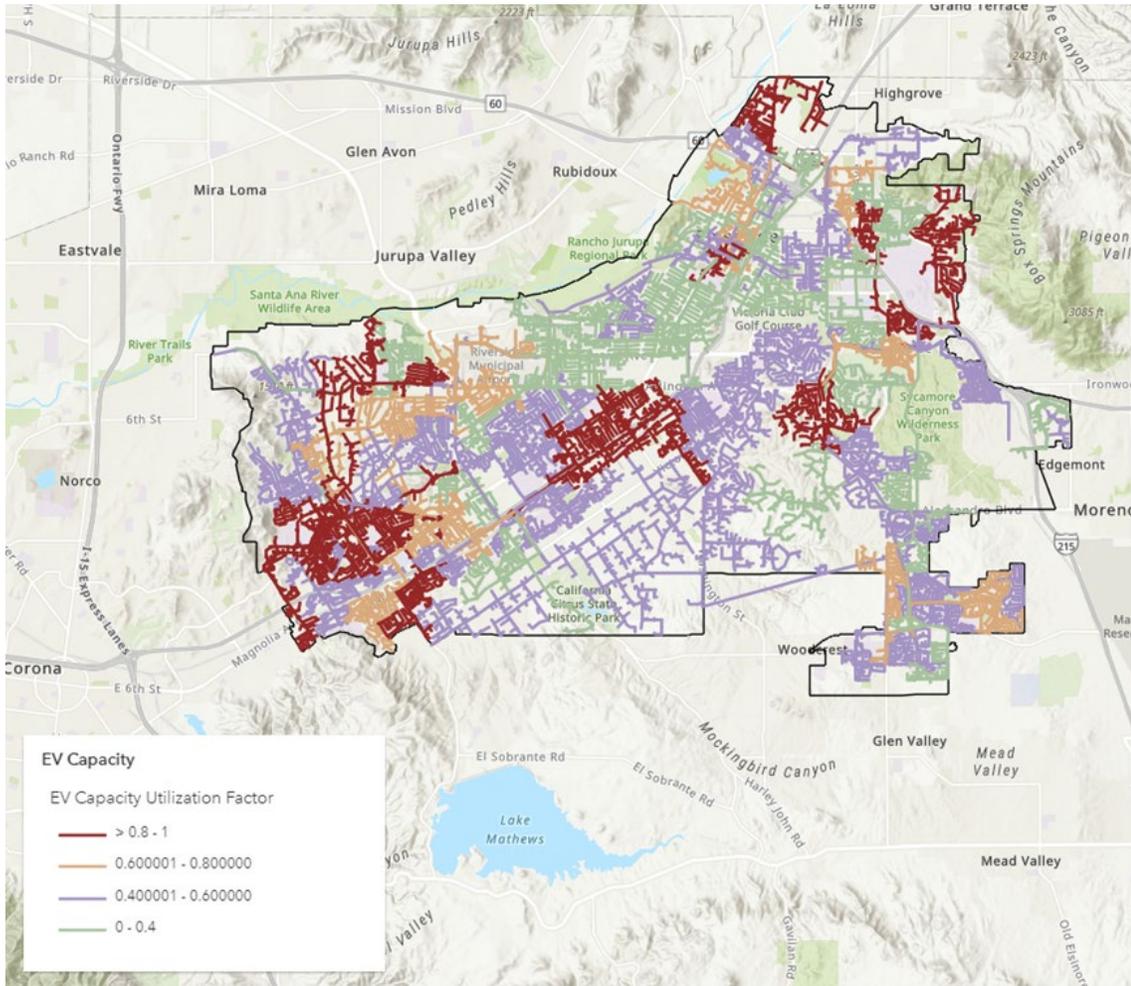
# DER IMPACTS: SUMMARY RESULTS

PV, EV, FS Metric of Interest	kW AC	Sum.MW (100%)	Additional Units at 100% Saturation	Sum.MW (50%)	Additional Units at 50% Saturation
Small Res PV System	5.00	142.51	28,502	71.26	14,251
Large Res PV System	8.00	142.51	17,814	71.26	8,907
Comm PV System	100.00	142.51	1,425	71.26	713
Level 1 EV Charger	1.90	374.31	197,005	187.16	98,503
Level 2 EV Charger	11.50	374.31	32,549	187.16	16,274
Heat Pump	9.60	345.37	35,976	172.69	17,988
Oven	3.30	345.37	104,658	172.69	52,329
Dryer	6.10	345.37	56,618	172.69	28,309
Water Heater	4.50	345.37	76,749	172.69	38,374
Whole House	23.50	345.37	14,697	172.69	7,348

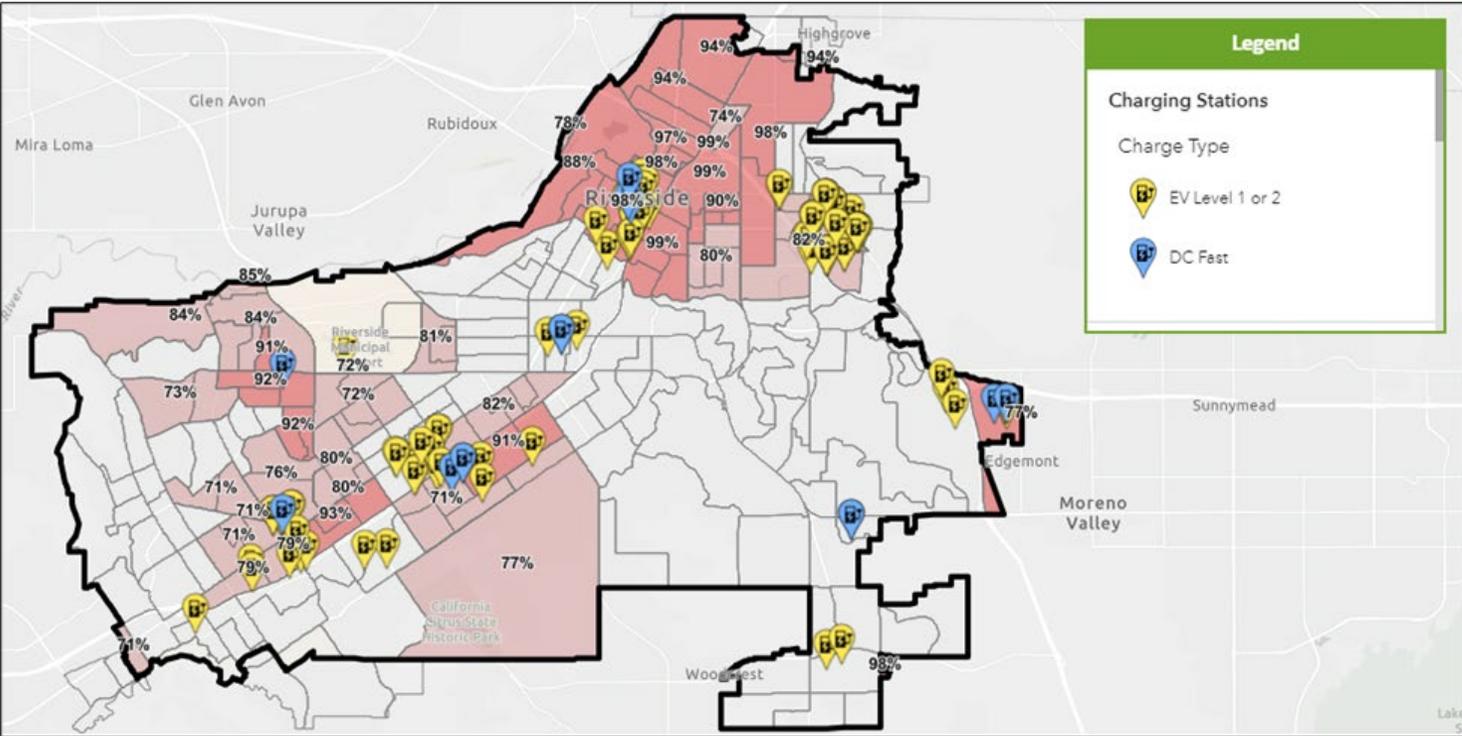
- Staff simulated additional PV, EV, FS units required to reach existing distribution system capacity limits.
- Results suggest RPU can likely accommodate substantial additions of these resources on most of its distribution grid. However, some circuits are already near their limits.



# DER IMPACTS: SPATIAL RESULTS

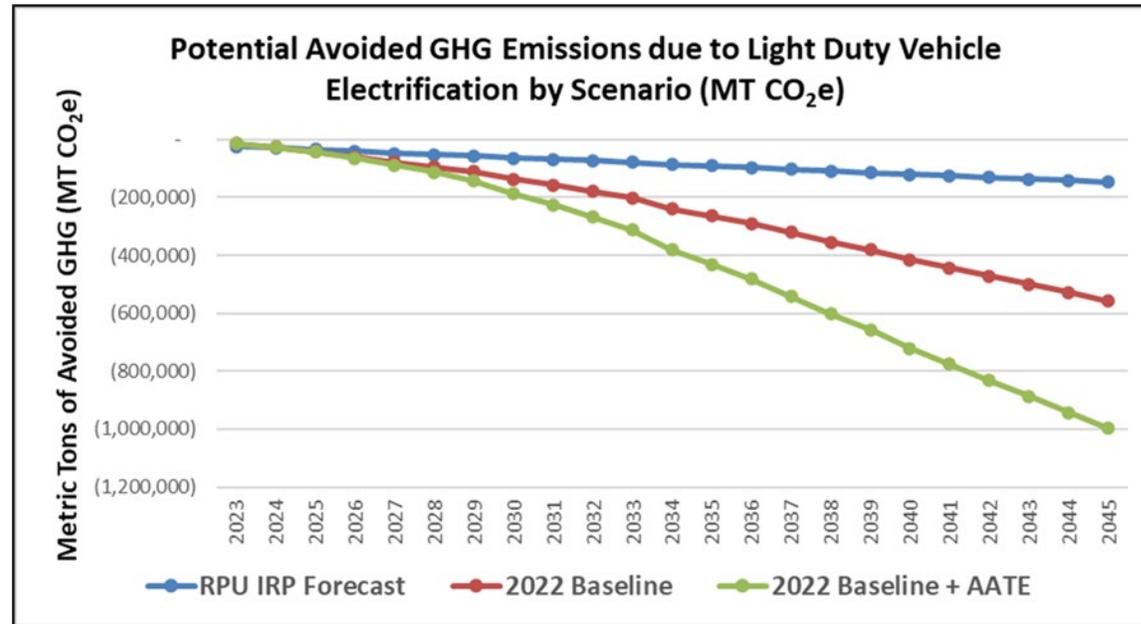
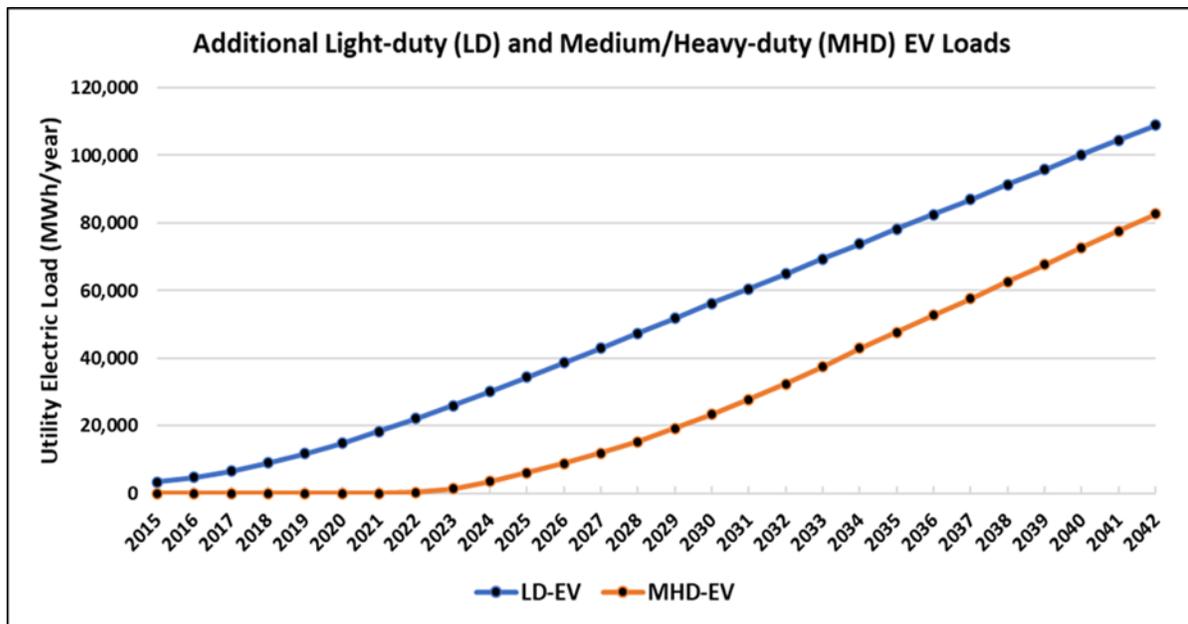


# EV CHARGING INFRASTRUCTURE



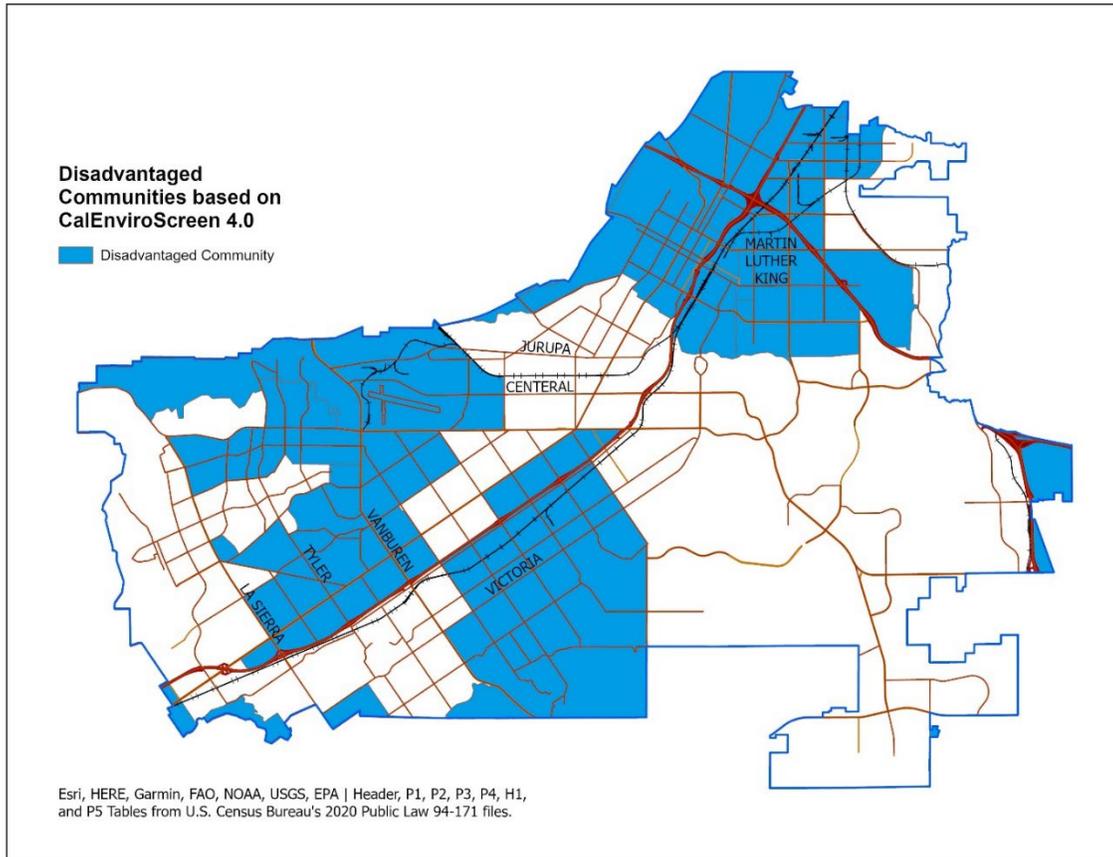
- As of Jan 1, 2024, there are approximately 223 Level 2 public chargers, and 59 DC Fast Chargers (40 of which are Tesla) installed in Riverside.

# KEY FINDINGS: TRANSPORTATION ELECTRIFICATION



- By 2030, EV energy demand in Riverside is forecasted to be ~56,200 MWh for Light Duty and ~23,300 MWh for Medium/Heavy Duty EVs.
- Overall increase to RPU's annual load is about 2%. These represent baseline assumptions in our IRP load forecasts.
- Annual emissions reductions in 2030 are almost 64,000 MT CO<sub>2</sub>e under our baseline assumption.
- Emission reductions would become much more significant under alternative (higher penetration) scenarios.

# DISADVANTAGED COMMUNITIES



- **Riverside has long been committed to implementing best existing and emerging sustainability practices**
  - Minimizing local air pollutants (RERC efficiency improvements).
- **This IRP provides a preliminary analysis of spatial pattern of recent EE rebates, including percentage of DAC customers receiving rebates, low income assistance, etc.**

# POTENTIAL FUTURE STUDIES

1. The role of future generation technologies in RPU's resource planning efforts (e.g., the need to study and identify viable resources to satisfy the baseload carbon-free energy needs in 2034 and beyond).
2. Improved methodologies for performing more comprehensive distribution system ICA studies (e.g., the need to build on our ICA to enhance our distribution planning efforts).
3. Potential future DR and/or EE/DSM efforts (e.g., the need to study and identify savings potential with novel EE, DSM, and DER programs – especially programs that can reduce our peak summer loads).
4. The value and benefits of a more comprehensive and integrated future TE planning effort (e.g., the need to develop a comprehensive EV Transportation enhancement plan).



# STRATEGIC PLAN ALIGNMENT

**Goal 4.1:** Rapidly decrease Riverside’s carbon footprint by acting urgently to reach a zero-carbon electric grid with the goal of reaching 100% zero-carbon electricity production by 2040 while continuing to ensure safe, reliable, and affordable energy for all residents.

**Goal 4.6:** Implement the requisite measures to achieve citywide carbon neutrality no later than 2040.

## Cross-Cutting Threads

---



Community Trust



Fiscal Responsibility



Sustainability &  
Resiliency



Equity



Innovation