

Driving Change
Accelerating the Electric Vehicle
Adoption Curve

EVOLVE

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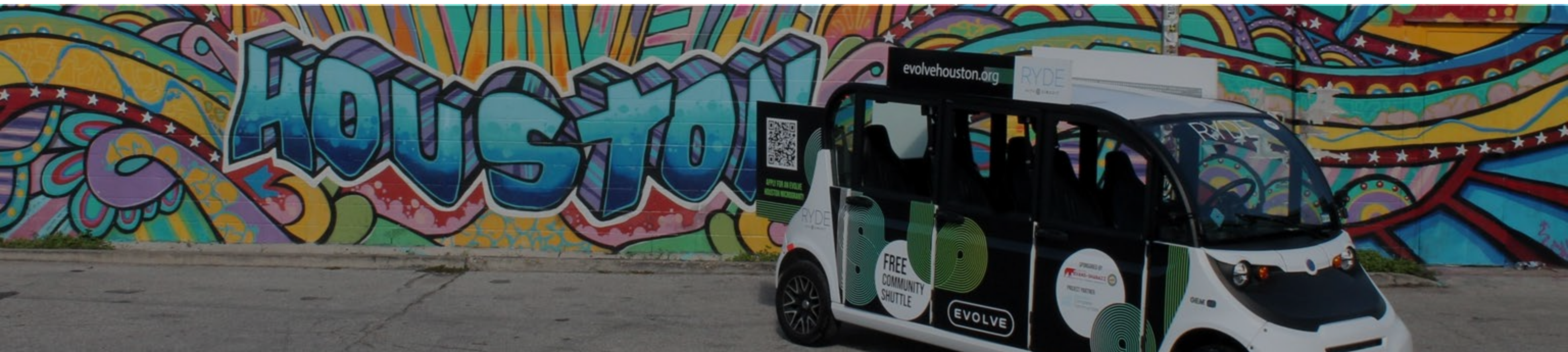
Background Information

Evolve's Mission

Improve air quality and reduce greenhouse gas emissions by increasing EV adoption in the Houston area.

Research Questions

- What are Houston's barriers?
- How do they compare to those in peer cities?
- How can Evolve adjust to Houston's unique barriers?
- How can impact be measured?



Findings

- City Adoption Success Factors: goals, incentives, and public chargers
- Determinants of Adoption: income and education
- High adoption potential ZIP codes within Houston
- Example used EV incentive from Los Angeles
 - CO₂ and NO_x reduction alone justifies \$1,000 incentive



Research Methods

- Peer City Case Studies
 - Austin, Charlotte, Los Angeles, and New York
- Review Existing Research
- Linear Regression
- Cost Benefit Analysis



Case Study Takeaways

Cities

- Austin
- Los Angeles
- Charlotte
- New York City

Strategies

- Published Climate Action Plans
- Policy Stacking & Collaboration
- Equitable Financial Incentives
- Charging Infrastructure



Existing Research Findings

- Key Adoption Determinants
 - Cost
 - Infrastructure
 - Regional Characteristics

Factor	Effect
Income	+
Price of Electricity	-
Price of Gas	+
Population Density	+
Financial Incentive for EVs	+
EV Infrastructure	+

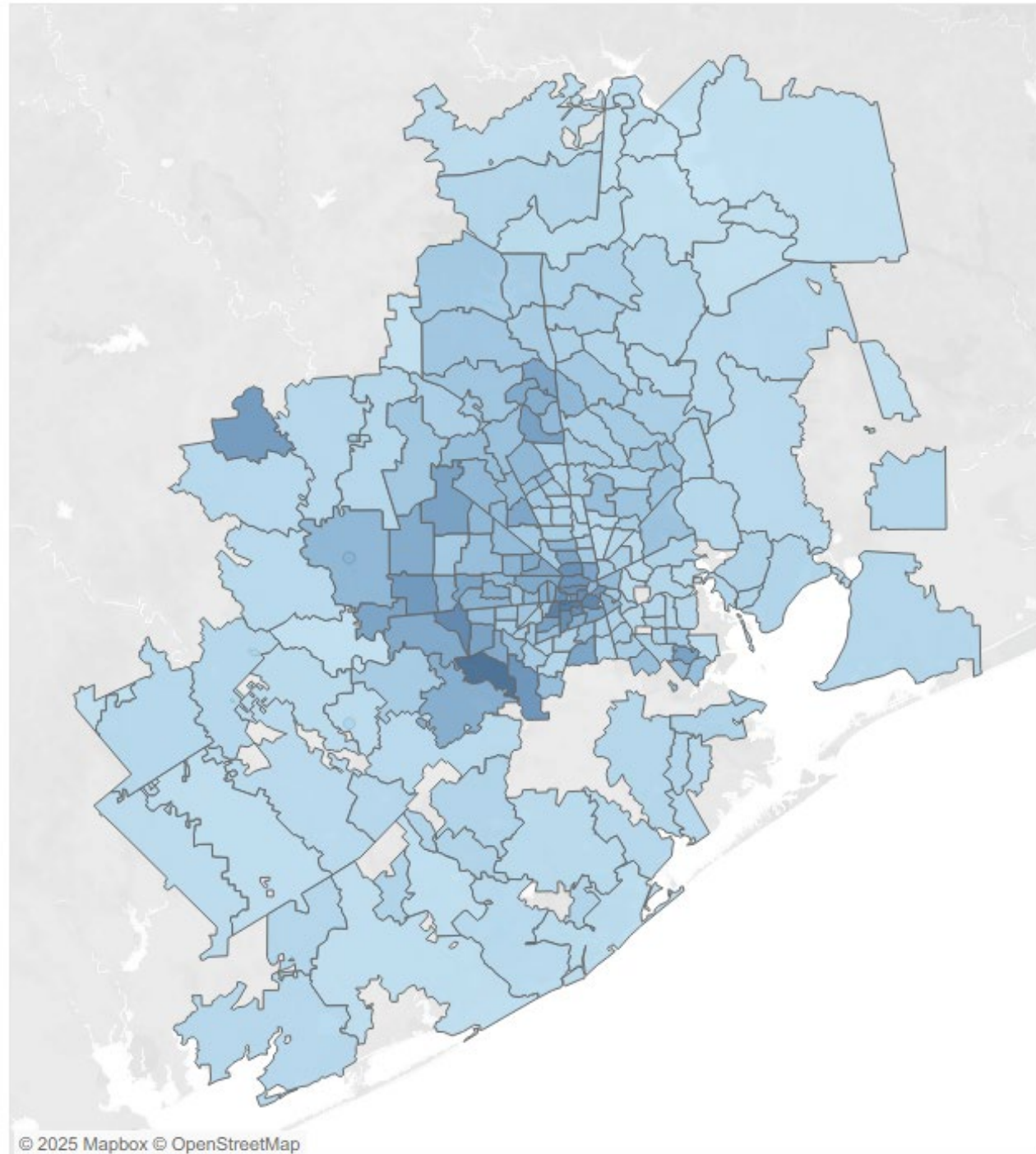
Houston Regression Methodology

- ZIP Code Level
- Linear Regression
- Census & National Renewable Energy Laboratory data
- Estimating EV share based on significant factors

Factor	Effect
Median Income	+
Population Density	+
Bachelor's Degree Proportion	+
Public Charging Stations/1,000 people	+
Public Charging Ports/1,000 people	-
Renter Occupied Housing Proportion	+

Houston Regression

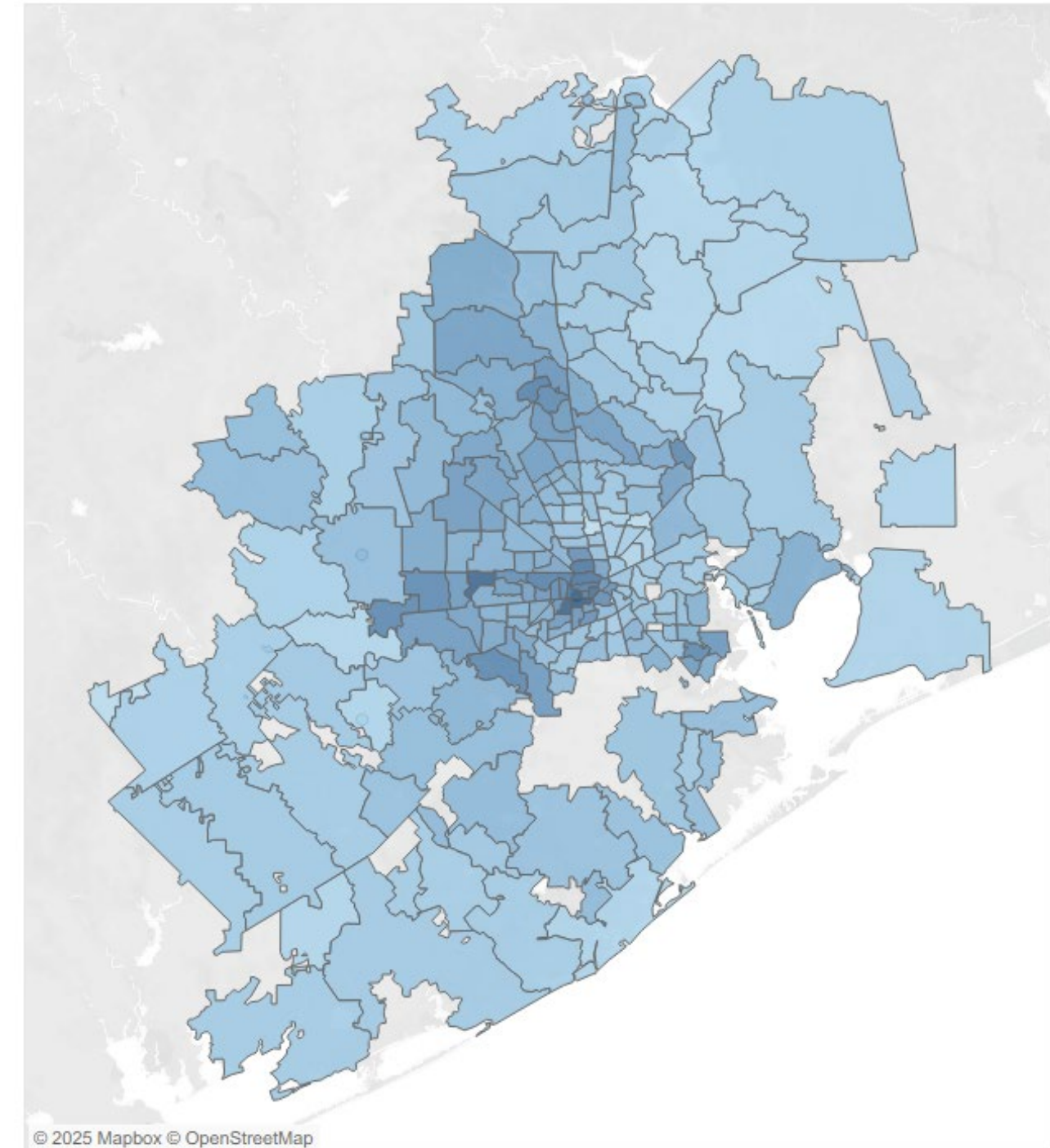
EV Share



EV Share



Predicted EV Share

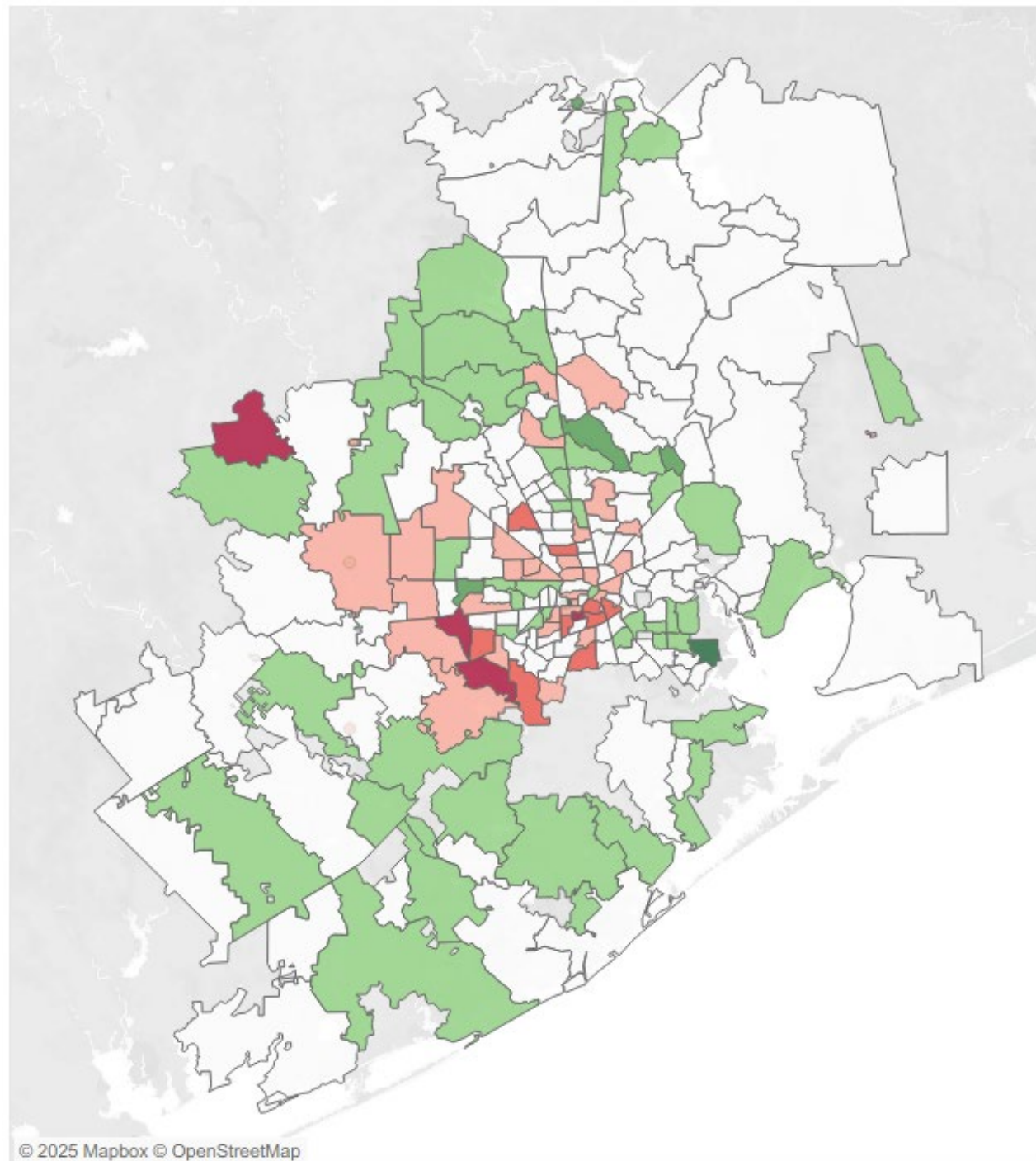


Predicted Share



Targeting

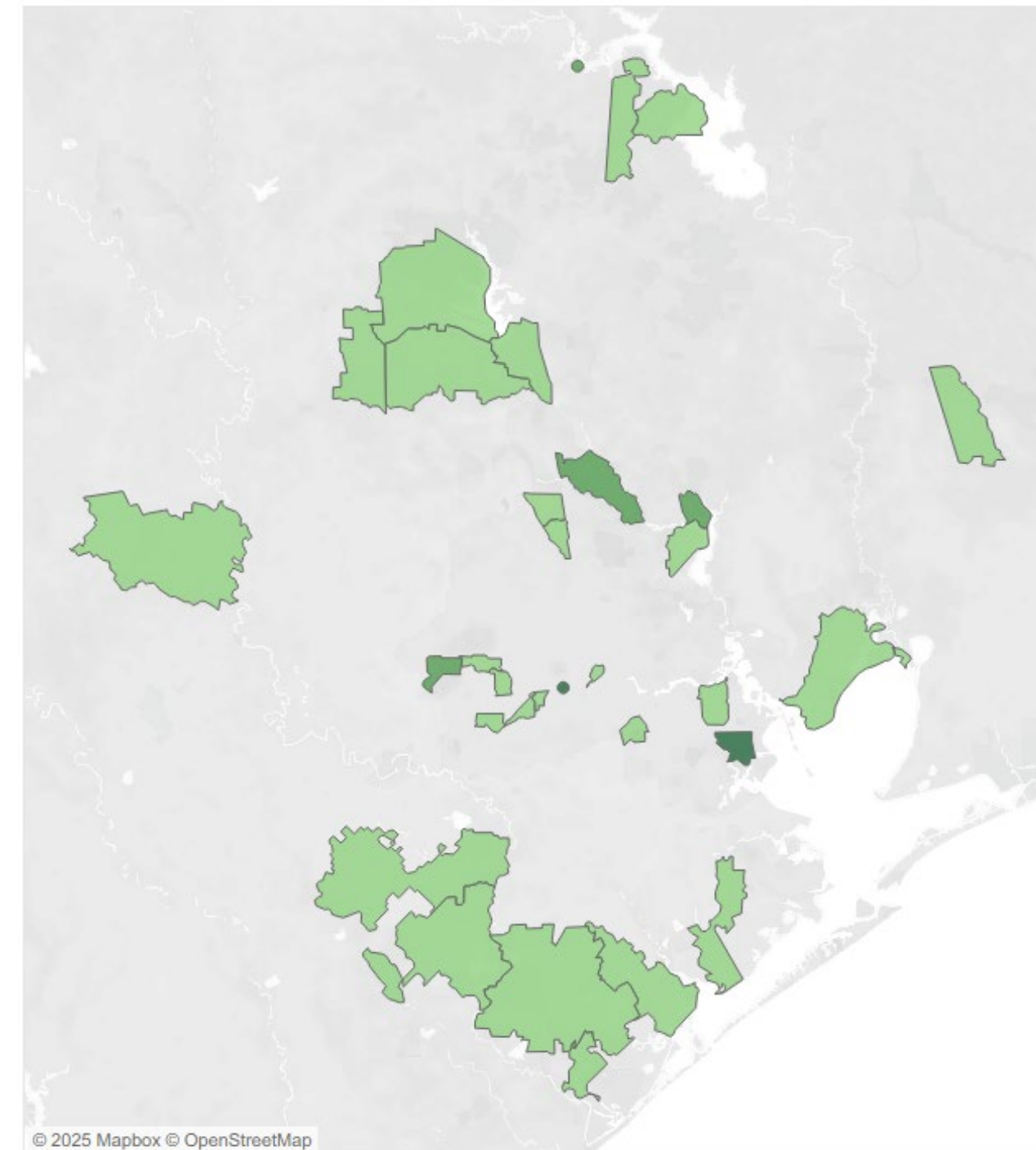
Predicted/Actual Share Diff



Diff Share



Target ZIP Codes



Diff Share



Example Program Implementation

- Los Angeles Programs: Clean Cars 4 All (CC4A) and Replace your Ride (RZR).
- Incentive for consumers replacing their older gas cars with used EVs.
- Funding: Public/Private Partnership.
- Carbon Dioxide and Nitrogen Oxide benefits only.

Estimates	Amounts
Vehicles Replaced	1,428
EPA Total CO2/NOx Benefit*	\$2,708k
Cost (\$1,000 rebate)	\$1,428k
Net CO2/NOx Benefit*	\$1,280k
Net Benefit per Vehicle	\$896

EV Awareness Survey

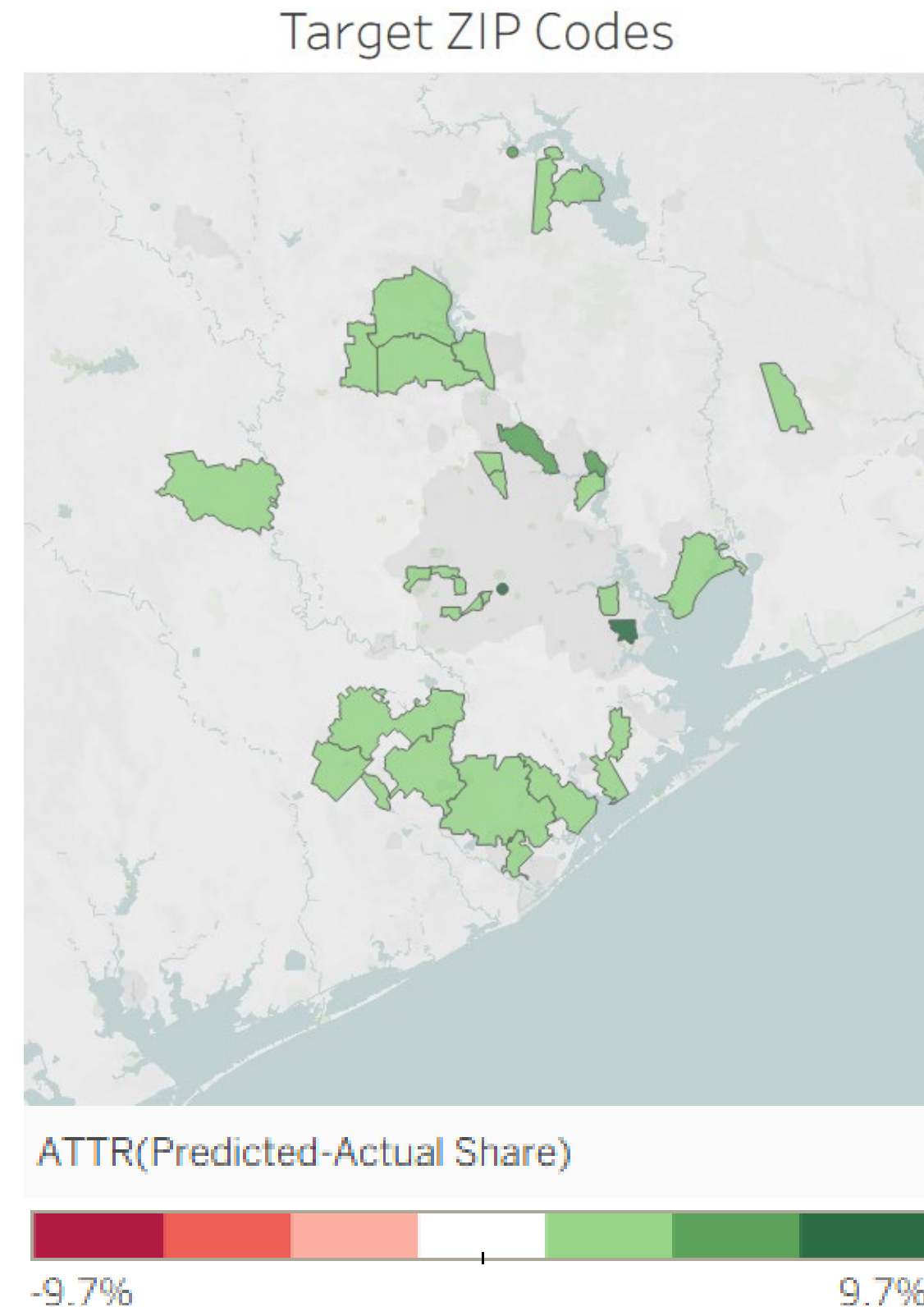
- Personal: age, ZIP code, race, and household income.
- Transportation: car ownership, commute time and method.
- EV Questions
 - Current EV ownership status.
 - EV purchase likelihood with and without rebates.
 - Reasons and concerns for EV ownership.
- EV Knowledge: driving range, charging time, costs and options.



Overview

Final Outcomes:

- City-Level Rebate Policy
- EV Awareness Survey
- Targeted Outreach



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