



# Electric Vehicles and the Roles of the Utility

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MJB & A

# About Us

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M.J. Bradley & Associates (“MJB&A”) is an internationally recognized consulting firm with a 23-year track record advising industry, NGOs, and government agencies on environmental and energy policy, technology, and implementation.

Our staff has professional experience from public, private sector, and non-governmental organizations, and advanced degrees in law, engineering, finance, policy, and environmental science.

## **Key areas of focus and expertise:**

- Power Sector
- Oil and Gas Industry
- Transportation and Electric Vehicle Technology and Policy
- Engineering and Technical Services

## **We apply our skills to help clients with issues including:**

- Market implications of emerging laws and regulations
- Market entry strategies for emerging technologies
- Investment strategies for environmental markets
- Investment due diligence
- Stakeholder coalitions on long-term energy sector strategy
- Tracking state, regional, and federal energy and environmental initiatives

# Representative Clients

Our clients are multi-national in scope and include energy and clean technology firms, environmental groups, transportation companies, and government agencies.

## Energy Sector Clients



## Municipal and Government Clients



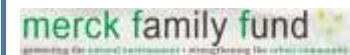
## Transportation Sector Clients



## Think Tanks, Policy Institutes & Advocacy Group Clients



## Foundations



# Two Principles for Electric Vehicles

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1. Because EVs are more expensive (battery cost) **electricity must be less expensive than gasoline** to recover the higher incremental capital cost of the electric vehicle battery
2. EVs need **200 mile plus range to replace an ICE vehicle** alleviating range anxiety and reduce the need for public fast charge infrastructure



# Critical Market Transformation is Needed

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The electric vehicle market is rapidly approaching a **tipping point**

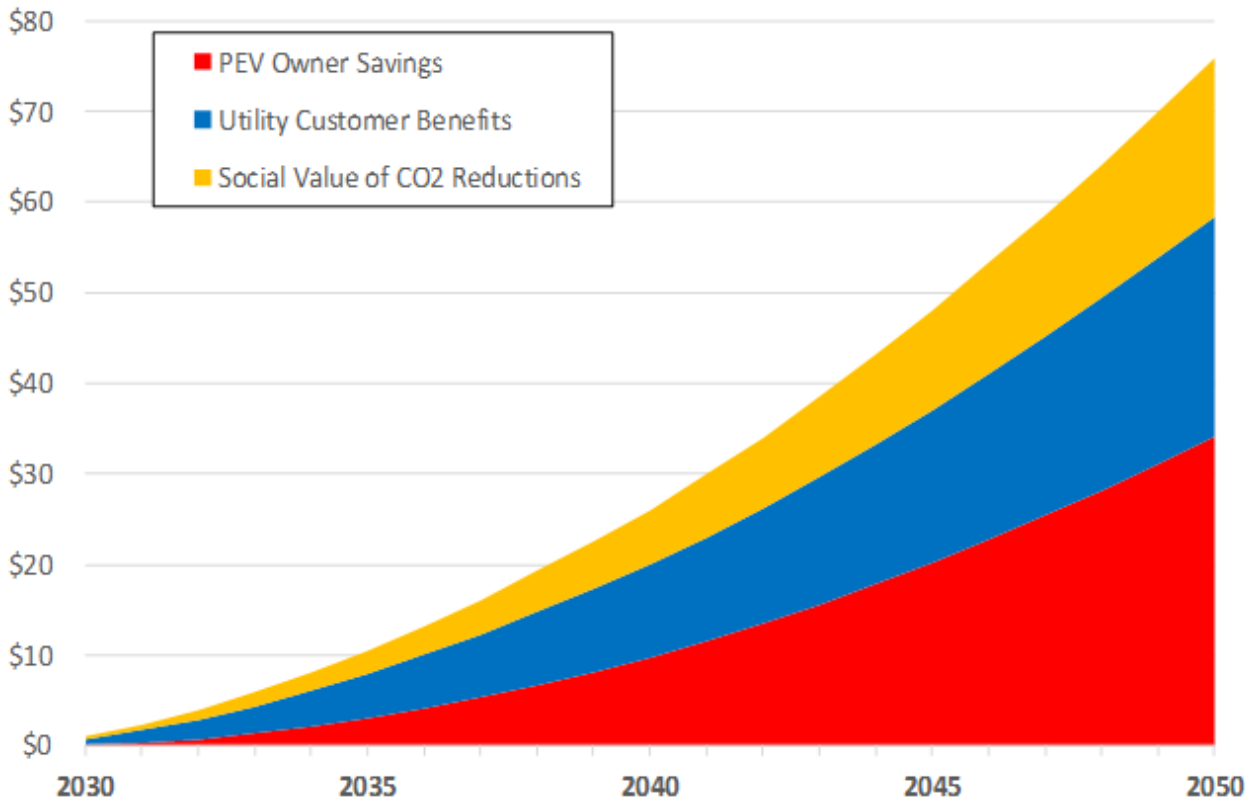
The transition to electric vehicles promises numerous **economic and environmental benefits** to consumers and society at large

However, consumers continue to be **discouraged** from PEV purchases

Rapid market transformation is needed to **meet state ZEV and climate change goals**

# By 2050 cumulative PEV benefits could exceed \$75 billion

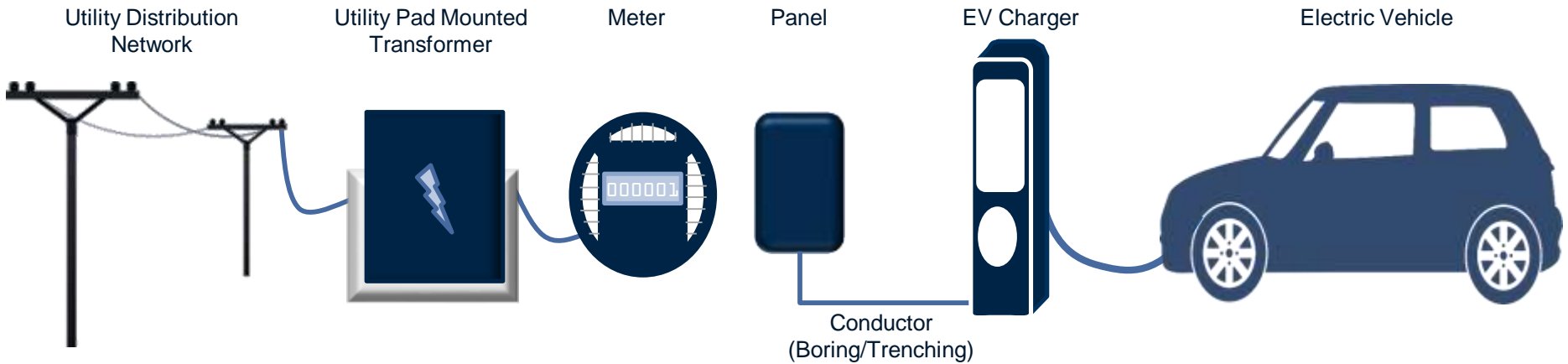
NPV Cumulative Net Benefits from Plug-in Vehicles in New York  
(80x50 Scenario- Off-peak Charging - Low Carbon Electricity)  
\$ billions



- 45% will accrue to PEV owners from savings in vehicle costs
- 32% will accrue to utility customers from lower electric bills
- 23% will accrue to society from the value of GHG reductions

NPV based on 3% discount rate

# Utility Investment Options in EV Charging Infrastructure



Business as Usual

Utility/Contribution in Aid of Construction

Host Site Investment

Make-Ready

Utility Investment

Host Site Investment

Owner-Operator

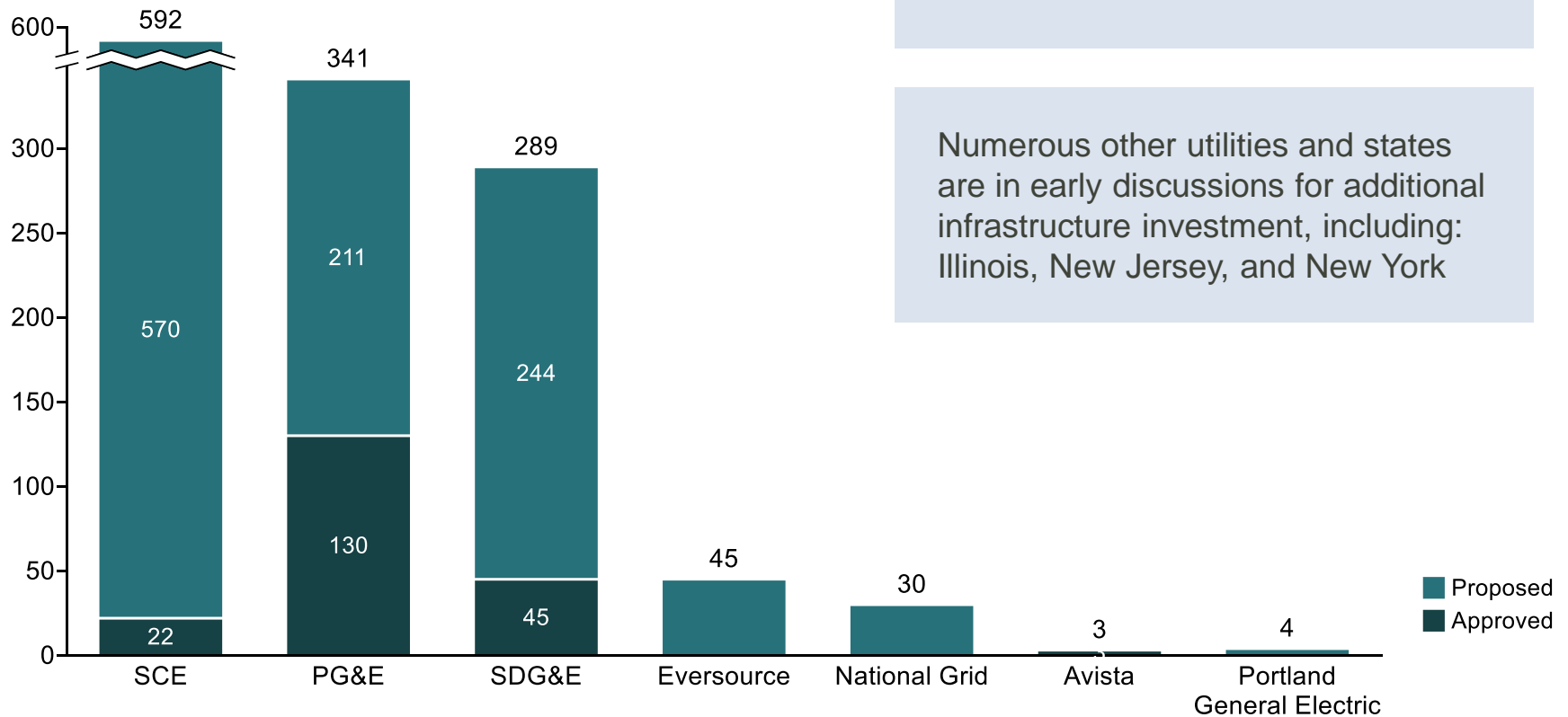
Utility Investment

Utility Incentive

Host Site / Third Party Investment

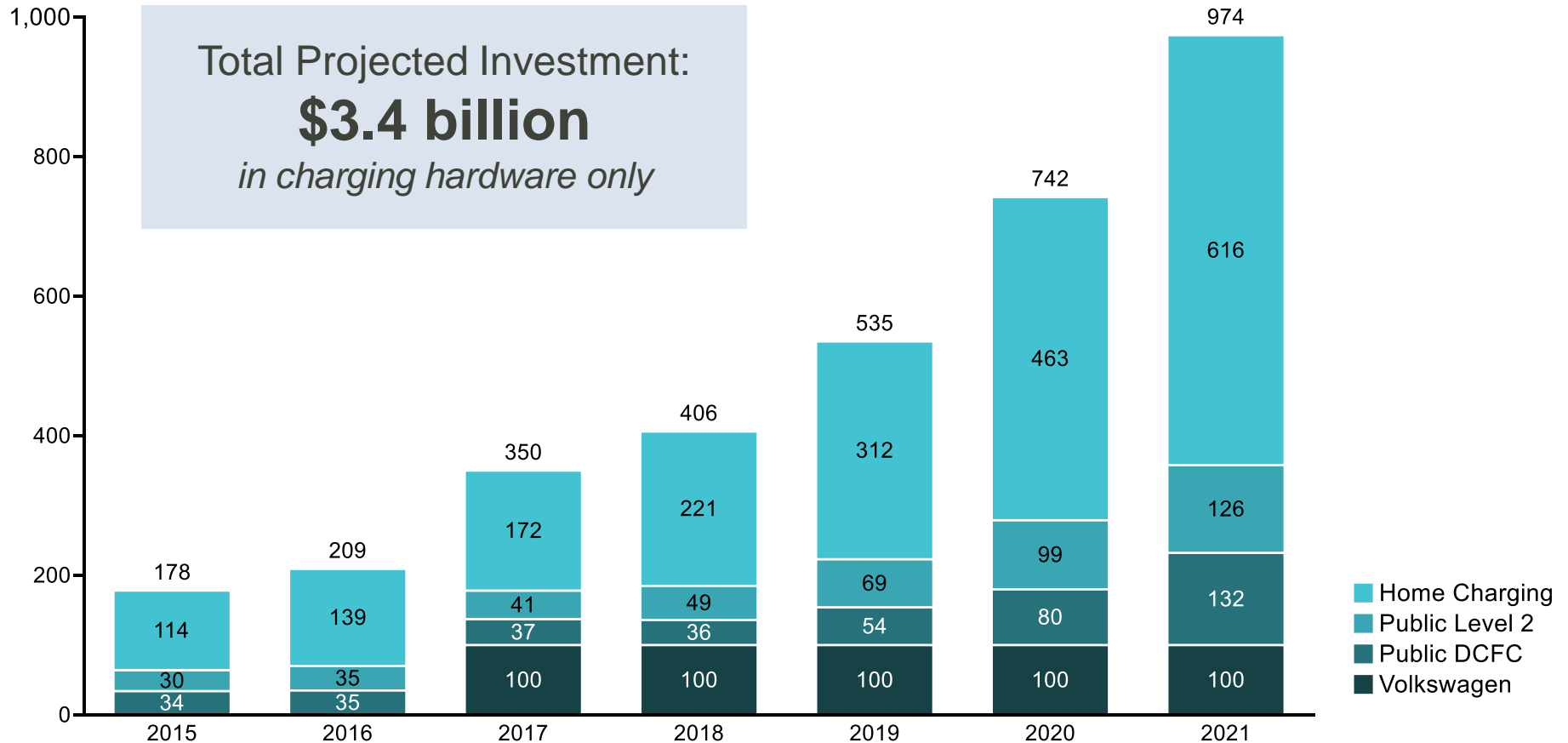
Utility Incentive Payment

# Proposed & Committed Utility EVSE Investment





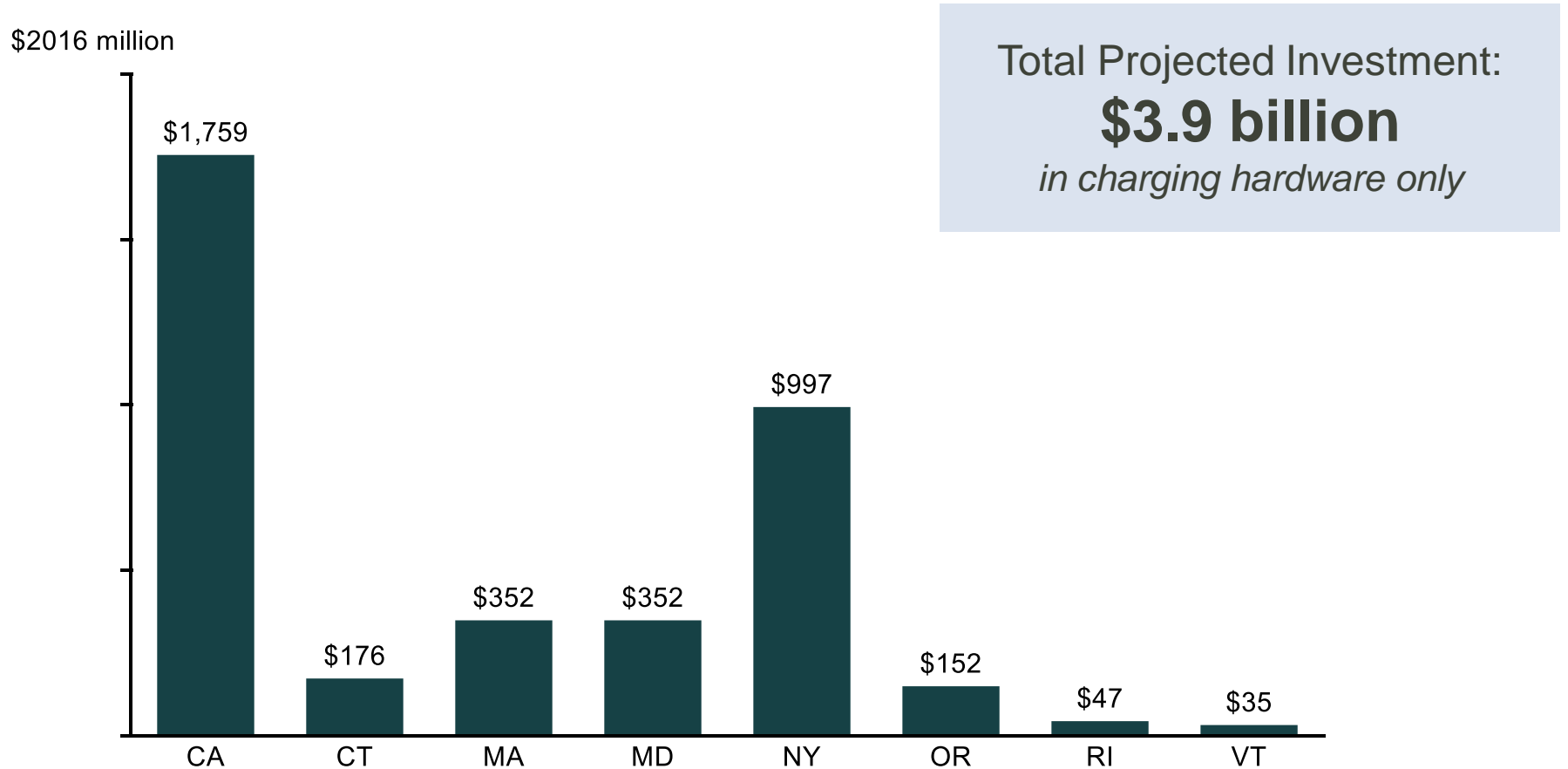
# EVSE Investment in the U.S. Needed to Support EV Sales, 2016-2021 (\$2016 million)



Source: Bloomberg New Energy Finance

Note: BNEF's EV sales forecast to 2040 to project associated EVSE sales. In 2016, we assume a ratio of 11 EVs per public level 2 connector, 58 BEVs per public DCFC connector, and 1.2 EV per Level 2 home connector. We assume a ratio of 2.2 connectors per charger. Except for home charging, we assume public charging utilization increases at a rate of 4% a year, while EVSE CAPEX fall at 2% a year. We assume total costs of hardware and installation to be \$1,200 for home chargers, \$6,000 for public level 2 chargers and \$60,000 for public DCFC in 2016.

# EVSE Investment in the U.S. Needed to Support ZEV MOU, by 2025 (\$2016 M)



Using chargers per vehicle and charger costs from BNEF analysis (see previous slide)

# Utilities Across the Country Have EV Programs



# SCE Charge Ready Pilot Program

**Program objective: Help increase the availability of EV charging stations at locations where cars are typically parked for four hours or more**

- Deployment of a minimum of 10 charging stations per site (5 in disadvantaged Communities)
- All charging stations must be installed on a new dedicated circuit deployed by SCE (with its own panel, meter, and service)
- The program covers all electric infrastructure costs related to the new circuit.
- SCE offers a rebate to offset the cost of the EV charger and installation
- SCE qualifies vendors and charging station models
- Operating costs, repairs and maintenance, EV charging network subscription, and electricity costs are the responsibility of the host site.



# SDG&E Power Your Drive

**Objective: install 3,500 EV charging stations in apartments, condos and businesses (10% in disadvantaged communities)**

- EV chargers are owned, operated and maintained by SDG&E at no cost to the site host, including all operational and maintenance costs, driver support and billing
- All charging equipment will be served from a separate SDG&E service and metered separately from the site host's electric service and account
- Dedicate a minimum of 5 parking spaces for EV charging stations
- Business: Dedicate a minimum of 10 parking spaces for EV charging stations



# Austin Energy: Plug-In Austin

## Charging Station Network

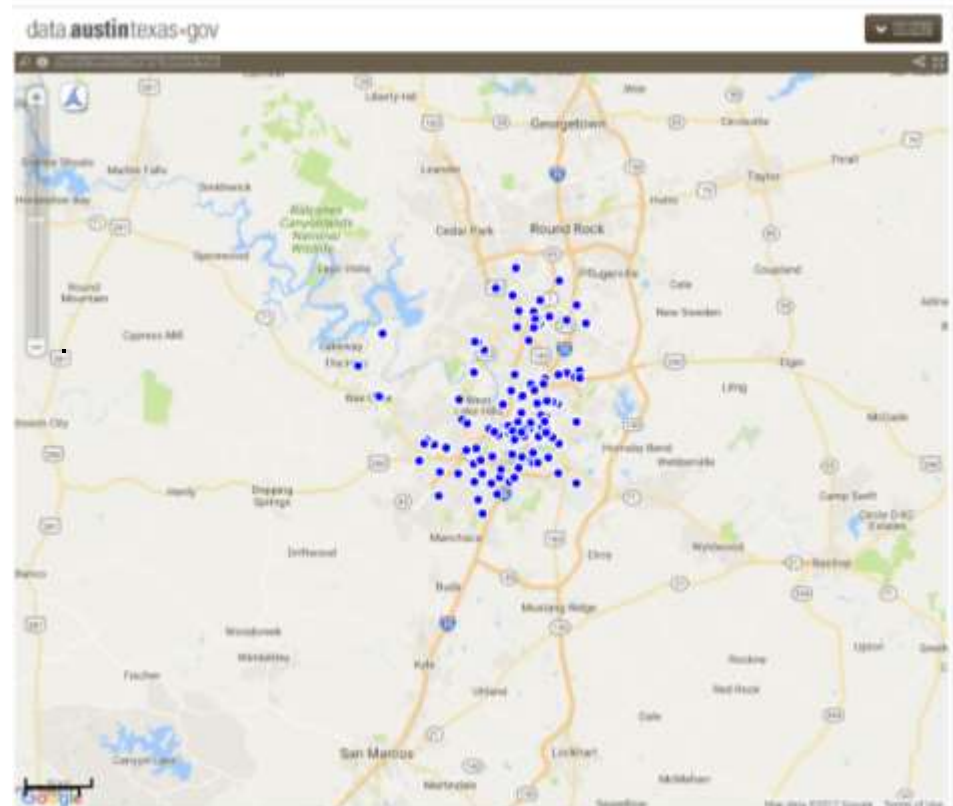
- The Austin Energy Plug-In EVerywhere™ network subscription plan - unlimited charging for \$4.17 per month
- Over 250 stations and counting

## Time-of-Use Rate (EV360)

- EV360- time-of-use rate allows home public charging for one flat rate
- \$30 per month for EV drivers with a demand of < 10kw and \$50/month with a demand greater than 10kw

## Home Charging Station Rebate

- 50% of the purchase and installation cost of a Level 2 (240V) charging station
- Maximum rebate \$1,500



# Charge NY

**Overall objective: install 3,000 personal electric vehicle charging stations by 2018. NYSERDA, the New York Power Authority (NYPA), and the New York State Department of Environmental Conservation (DEC) are collaborating on this initiative.** Together, these agencies have instituted a suite of policies to reach this goal and further improve electric vehicle adoption.

- Vehicle Rebates: Up to \$2,000 per vehicle through NYSERDA's Drive Clean Rebate
- NYPA-Supported Charging Stations:
  - NYPA has completed a competitive solicitation for 300 EVSE for municipalities. The contract includes hardware, software, and installation services; municipalities can also self-install with NYPA-provided hardware and software
  - NYPA finances prospective EVSE projects through five-year loans with low government-to-government interest rates. In addition, customers can use DEC funding to pre-pay the NYPA loan and avoid interest expenses.
  - Signature Charge NY Station Locations
    - NY State Thruway: EV rapid chargers at travel plazas in Malden, Modena, Plattekill and Ulster, installed in partnership with the NYS Thruway Authority and Nissan, N.A.
    - Train stations: Metro North in Westchester County
    - Airports: Albany, Buffalo and Niagara
    - Municipal parking lots: Queens, Brooklyn, Staten Island



# East Coast Utility EV Initiative

## MJBA&A Facilitated Collaboration

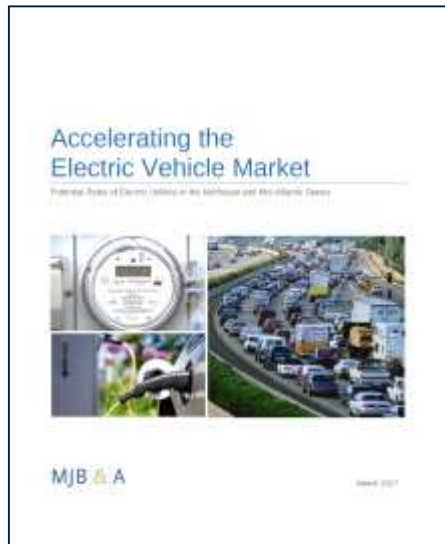
- The Utility EV Initiative is a group of leading east coast electric utilities collaborating to address key market, regulatory and technical factors affecting the growth of the regional electric vehicle market.



- The mission of the Utility EV Initiative is to advance the electrification of the transportation segment through consumer engagement and education, making the case for utility programs to help accelerate EV charging infrastructure deployment, and integration of EVs into the electric grid for the benefit of all electric customers.



# Accelerating the EV Market & Cost Benefit Analyses



MJB&A has worked with a coalition of utilities and advocates to analyze the consumer and societal benefits of increased EV adoption and identify key roles utilities can play in facilitating that market transformation

## *Key Messages:*

- ✓ A majority of EV benefits accrue well beyond drivers to include electric customers and society as a whole
- ✓ Cost benefit analyses used to evaluate EV investment must incorporate a broader range of benefits
- ✓ We are still in the very early stages of the development of the EV market
- ✓ The competitive market for infrastructure is still under development
- ✓ There are many possible utility investment models
- ✓ Utilities have an obligation to serve and integrate EV load
- ✓ Harnessing the power of EVs could be a key to cost-effective grid management



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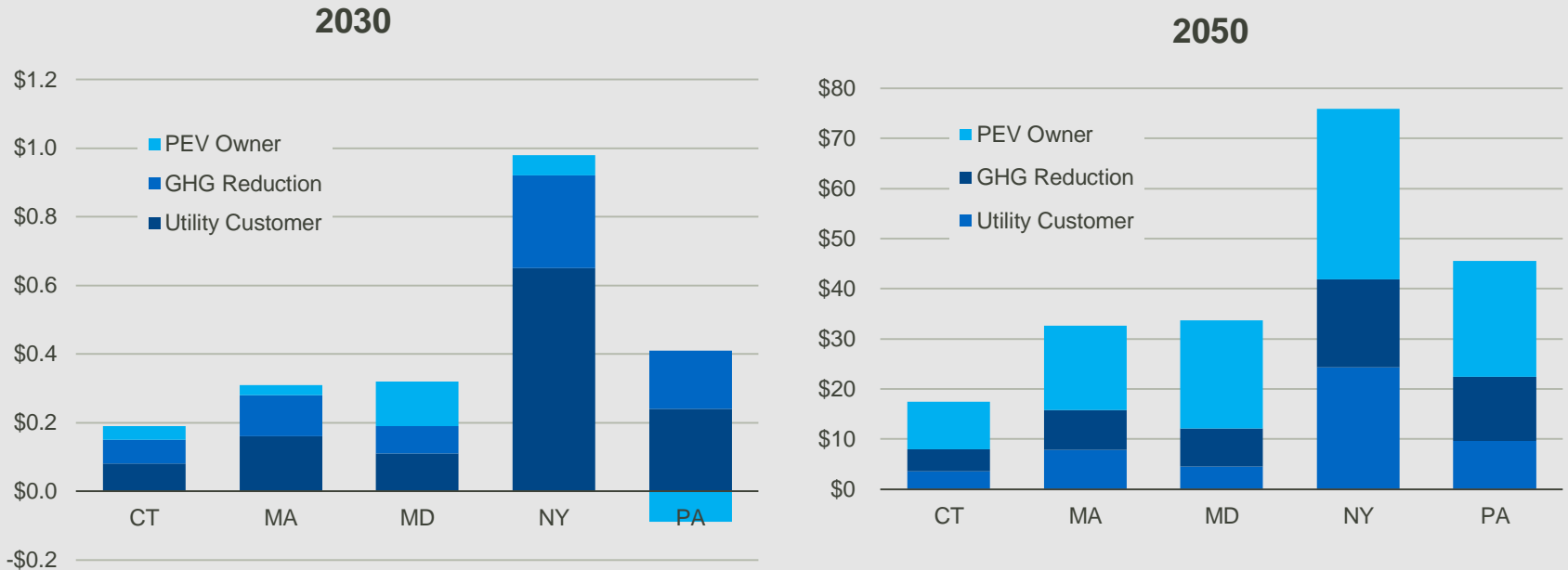
# Appendix

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# MJB&A Analysis: Cumulative Net Benefits

Total benefits of reaching ambitions electrification levels in line with reducing emissions 80% below 1990 levels by 2050 show state-level benefits ranging from **\$17.3 to \$75.9 billion**

## NPV Cumulative Net Benefits, 80 x 50 Scenario (\$2016 billions)



- Cumulative benefits are generally proportional to the size of the vehicle fleet
- State-to-state differences in projected electricity costs affect both PEV owner and utility customer benefits
- State-to-state differences in 2030 grid carbon intensity affect GHG reduction benefits