



Models for Utility Engagement

Beneficial Electrification Meeting I: Introduction and Focus on Electric Vehicles

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Rhode Island PUC, Division of Public Utilities and Carriers, and Office of Energy Resources

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About Us

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

ConEdison Exelon. NEXtera ENERGY
 Dominion nationalgrid PG&E CALPINE
 It all starts here. The power of action.

Municipal and Government Clients

New York Power Authority LA DWP Los Angeles Department of Water & Power
 Seattle City Light AUSTIN ENERGY THE PORT AUTHORITY OF NY & NJ

Transportation Sector Clients

BAE SYSTEMS Massachusetts Bay Transportation Authority
 [CSX] How tomorrow moves

Think Tanks, Policy Institutes & Advocacy Group Clients

NESCAUM CENTER FOR THE NEW ENERGY ECONOMY
 CLEAN AIR TASK FORCE Ceres NRDC EDF ENVIRONMENTAL DEFENSE FUND
 Finding the ways that work
 WORLD RESOURCES INSTITUTE
 GEORGETOWN CLIMATE CENTER

Foundations

ENERGY FOUNDATION building a new energy future
 Barr Foundation
 merck family fund protecting the natural environment • strengthening the urban community
 Bloomberg Philanthropies

Background

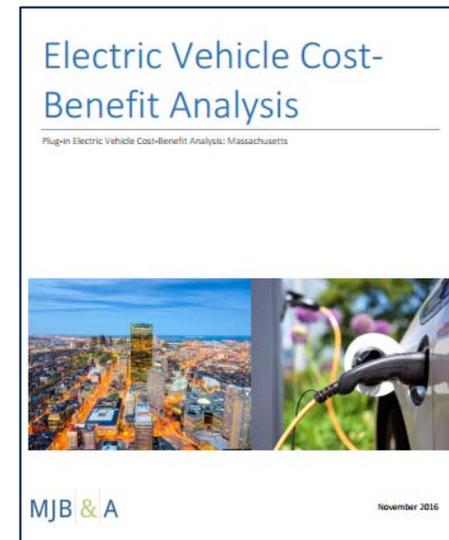
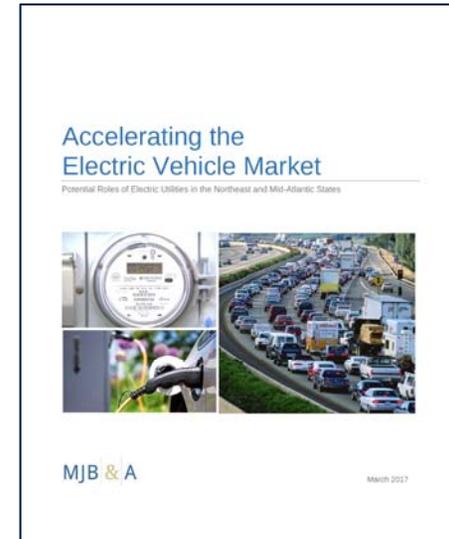
- The **electric vehicle market is rapidly approaching a tipping point** as vehicle purchase prices continue to fall, performance improves, and auto manufacturers develop mass market models with ranges over 200 miles.
- The transition to **electric vehicles promises numerous economic and environmental benefits to consumers and society at large** – increasing utilization of the electric grid and driving down rates for all ratepayers.
- Despite these broadly shared advantages, however, **consumers continue to be discouraged from PEV purchases** by:
 - Insufficient consumer education and awareness
 - Suboptimal charging rate design and
 - Inadequate charging infrastructure

In order **to meet state ZEV and climate change goals** requires:

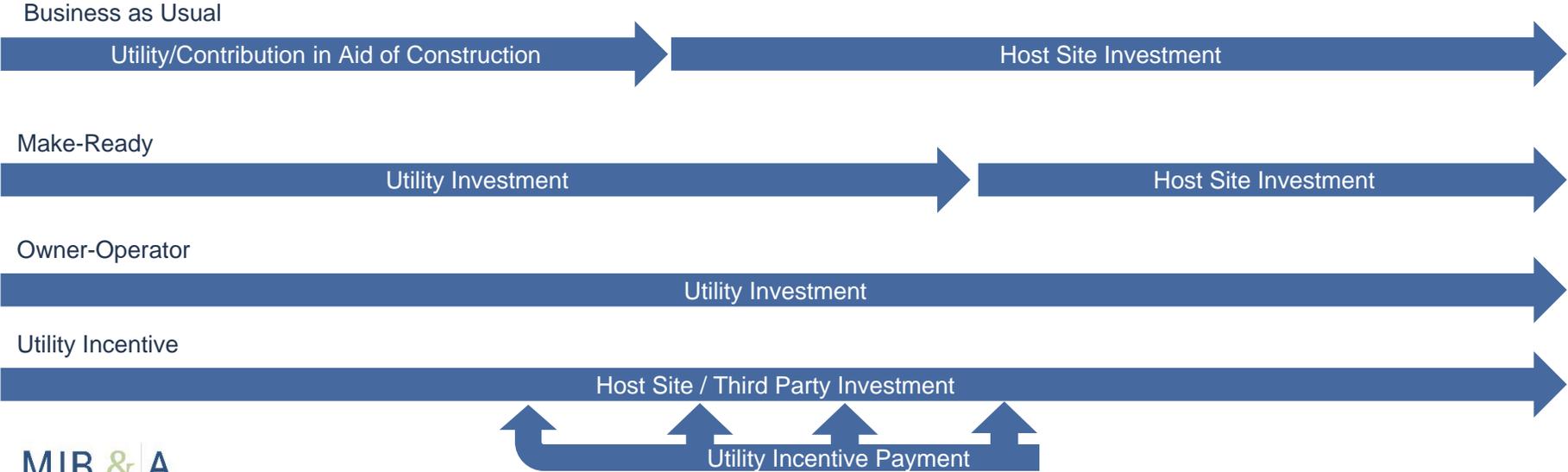
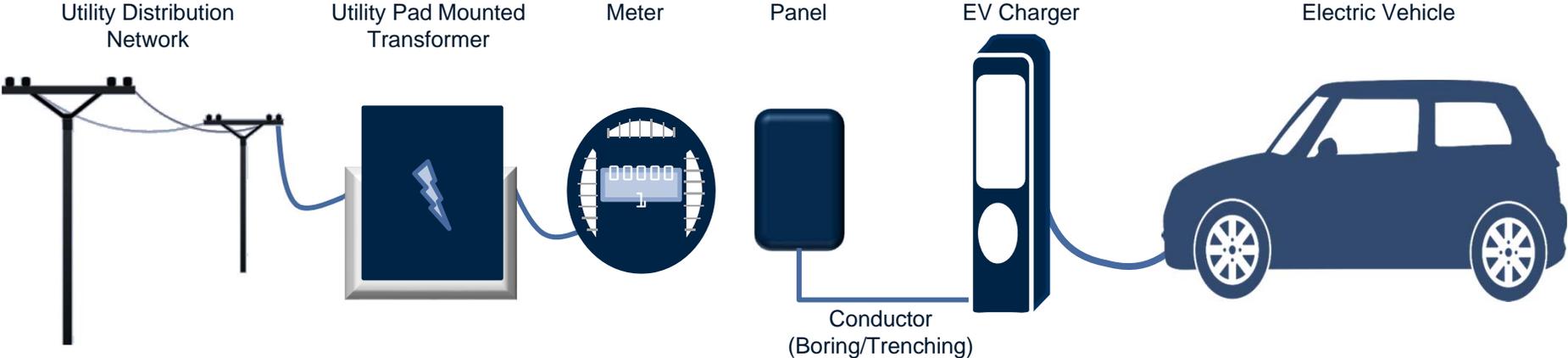
- Rapid market transformation
- Integration with the grid
- Widespread access for all customers

Key Messages

- **Still Early in the EV Market.** We are still in the very early stages of the development of the EV market – adoption is low and consumer charging needs and preferences are uncertain
- **There is Not a Preferred Utility Investment Model.** A preferred utility investment model has not emerged, rather different pilots and phased programs are being implemented and tested – more involvement by a greater number of utilities is necessary
- **The Competitive Charging Market is Still Under Development.** While a competitive market does not currently exist, regulators can facilitate the development of one through attention to interoperability between charging stations, reliability of the EVSE and transparency in retail rates and pricing
- **Utilities have an Obligation to Serve EV Load.** Regardless of the utility investment in EV charging infrastructure or customer pricing models, utilities have an obligation to serve and manage EV charging load
- **EVs are a Flexible Load.** Harnessing the power of EVs could be a key to cost-effective grid management. Over the longer term, as more EVs are on the roads, there are opportunities for renewables integration, greater electric system utilization.
- **Traditional Cost-Benefit Analysis.** A traditional cost-benefit analysis for utility infrastructure investment may show costs outweighing benefits in the near term until higher levels of EV penetration.



Utility Investment Options in EV Charging Infrastructure



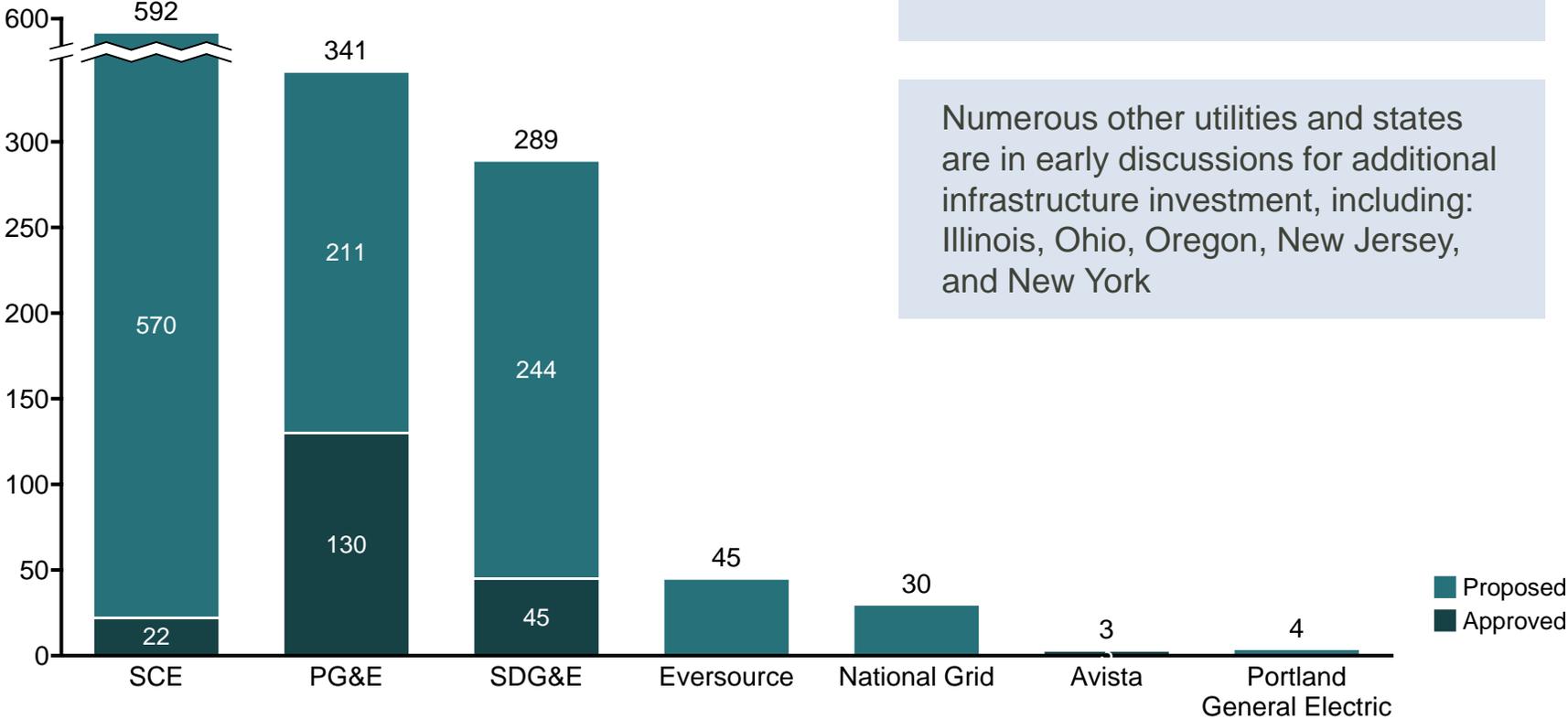
Utility Investment Options Attributes and Considerations

Utility Investment Options	Implementation Attributes and Considerations
Make-Ready	<ul style="list-style-type: none"> • Can take advantage of utility access to capital to lower costs and increase pace of development. • Utility will need to determine how investment costs will be recovered and who will pay. • Approach enables flexibility of host site to choose EVSE provider and driver charging pricing plan.
Owner-Operator	<ul style="list-style-type: none"> • Streamlined program administration: utility would use experience with previous programs in all stages of developing and operating EVSE: marketing and recruitment, planning and permitting, construction and interconnection, and ongoing operation and maintenance. • Could crowd out alternative providers from the market • Could result in stranded cost for utilities if utilization is lower than expected, putting customer dollars at risk.
Utility Incentives	<ul style="list-style-type: none"> • Reduces the upfront EVSE costs to all developers and customers. • Can be structured to incentivize certain EVSE functionality (e.g., two-way communication capabilities). • May not provide as much development support and fail to develop necessary EVSE for market

Proposed & Committed Utility EV Charging Infrastructure Investment

Total Utility Investment:
\$1.3 billion

Numerous other utilities and states are in early discussions for additional infrastructure investment, including: Illinois, Ohio, Oregon, New Jersey, and New York



Utility EV Charging Rate Design

Charging Rate Options	Pros	Cons
Standard Rate	<ul style="list-style-type: none"> No change in electric rate structure or customer offering or electric meter. 	<ul style="list-style-type: none"> Does not incent customer charging behavior to reduce peak load impact of charging. Does not maximize PEV owner's cost savings between electric and gasoline.
Whole House TOU Rate	<ul style="list-style-type: none"> Single utility-installed TOU meter for entire household encouraging customer to shift all kWh usage off peak. 	<ul style="list-style-type: none"> Depending on the rate plan, PEV owners may have to shift a substantial portion of household electric load (kWh) in order to save money compared to the standard rate.
PEV-Only TOU Rate	<ul style="list-style-type: none"> Separate TOU rate allows the customer to understand electricity usage and cost. Provides data to utility on charging behavior. 	<ul style="list-style-type: none"> The cost of installing a second meter and associated customer charges can be prohibitive.
Incentive / Rewards Programs	<ul style="list-style-type: none"> Low cost charging circuit monitoring device avoids the costs associated with purchase and installation of a second meter. 	<ul style="list-style-type: none"> kWh usage data would need to be provided by EVSE, monitoring device or vehicle.

California IOU EV Program Comparison

			
Scope	Up to 3,500 L1 & L2 at 350 sites (60% of original 5,500) 3 years	7,500 L2 3 years	1,500 L1 & L2 (5% in Phase 1) At least 12 months
Cost	\$45M (40% of original \$103M)	\$130M	\$22M (6% of total \$355M)
Charger Ownership, O&M	SDG&E owned	Site host has choice of ownership: PG&E can own in MUDs and DACs (up to 35% of chargers) Site host owns at workplaces	Site host owned
Equipment & Services Choice	Site host choice of pre-qualified service providers	Site host choice of pre-qualified service providers	Site host purchase of pre-qualified service providers
Participation Fee	Participation fee TBD with advisory council	Tiered rebates for site host-owned units Tiered "participation payment" for PG&E-owned units	Site host buys equipment 25-50% rebate from SCE
Rates/Pricing	Choice of VGI rate to driver or to site host	Site host pays commercial rate, can pass thru rates to driver or set own pricing	Site host pays commercial rate, sets pricing

California IOU EV Program Comparison (continued)



Target Markets	Target 50% MUD / 50% Workplace	MUD: minimum 20% (target 50%) Workplace: 50%	Workplace, MUD, Public/Retail (no specific allocation)
Phasing	Semi-annual progress reports Phase 2 would be filed separately	Quarterly progress reports Separate application for Phase 2, any savings from Phase 1 can fund "bridge" period	After 12-24 months, SCE to serve pilot report and Phase 2 application
Load Management	VGI rate reflects grid conditions; if site host takes rate, must submit load management tactics	Program advisory council to help develop standards for load management Develop DR program within 3 years	Evaluate load management strategies in Pilot Develop DR program within 3 years
Disadvantaged Communities	10% commitment; CARE customers excused from rate-base of program	15% commitment with 20% stretch goal; No \$5M for vehicle equity programs	10% commitment; 100% rebate for charger costs in DACs
Site Host Recruitment	SDG&E + 3 rd party partners	PG&E + 3 rd party partners	SCE + 3 rd party partners
Advisory Committee	Yes	Yes	Yes

Massachusetts Proposed EV Program Comparison



	EVERSOURCE	nationalgrid
	Make-Ready approach	Make-Ready approach
Scope	Phase I: 1,000 Level 2 port, 32 DCFC stations Phase II: 3,100 Level 2 ports, 35 DCFC stations	Level 2: 600 stations; 1,200 ports DCFC: 80 stations; 80 ports
	5 years	3 years
Cost	\$45M	\$25M
Charger Ownership, O&M	Host site owns EVSE; EVSE O&M for 10 years after installation	Host site owns EVSE; EVSE O&M for minimum of 5 years after installation
Equipment & Services Choice	Site host choice of pre-qualified EVSE service providers	Site host choice of pre-qualified EVSE service providers
Participation Fee	Participants purchase EVSE	Participants must contribute toward cost of EVSE; National Grid incentive for the balance of EVSE cost, where public incentives or other funding sources are not available – proposed amounts vary by segment
Rates/Pricing	Site host to pay commercial rate for electricity consumed at charging station and sets pricing for driver	Site host to pay for electricity consumed at charging site at current rate for at least first 5 years and decide how driver pays at station

Massachusetts Proposed EV Program Comparison (continued)



Target Markets

Long-dwell locations for Level 2 sites
High traffic locations for DCFC sites
10% investment in DCFC sites

Long-dwell locations for Level 2 sites;
High traffic locations for DCFC sites

Load Management

N/A

Host sites must commit to participant in future National Grid demand response programs

Disadvantaged Communities

10% commitment

10% commitment
Up to 100% incentive for Level 2 EVSE cost

Site Host Recruitment

Eversource + 3rd party partners

Nation Grid + 3rd party partners

Education and Outreach

Campaign to target potential EV buyers and raise awareness on benefits of EV ownership including cost savings through off-peak rates and emissions reductions via digital and radio media, bill inserts, and ride and drives

Separate Marketing, Communications, and Education Plan will serve to increase customer familiarity with EVs through advertising, events, social media, while also working to recruit businesses to be host sites



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Select MJB&A Transportation Electrification Projects

State-level PEV cost-benefit analyses

- This project estimated state-wide net benefits of high levels of PEV penetration between 2030-2050 (8-state ZEV MOU and 80x50 scenarios).
- The analysis included the states of Connecticut, Maryland, Massachusetts, New York, and Pennsylvania.
- The studies were conducted for NRDC to provide input to state policy discussions about actions required to promote further adoption of electric vehicles. MJB&A is recently released an analysis for Colorado and has been asked to analyze Ohio as well.

East Coast Utility Electric Vehicle Initiative

- 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.
- MJB&A provides facilitation, technical, and strategy support to Utility EV Initiative participants. On behalf of the initiative, MJB&A has authored a white paper on the roles of electric utilities in transportation electrification.

New York benefit cost analysis framework

- This project will adapt the existing New York Reforming the Energy Vision (REV) benefit cost analysis (BCA) framework for PEVs.
- NYSERDA commissioned the study to inform the ongoing REV proceeding in New York.
- MJB&A is collaborating with E3 and ICF on this project and facilitating a utility stakeholder group to provide input to the modeling assumptions.