How MCR Helped AES Develop a Cost-Effectiveness Analysis for EV Programs in Ohio and Indiana

BACKGROUND

In 2022, the global energy company AES recognized that the pace of electric vehicle (EV) adoption was accelerating, and that there would be impacts on its resource and system planning as well as on its investments at its Indiana and Ohio electric utilities. AES had a compliance requirement to file its electric security plan (ESP) in Ohio, and an opportunity in Indiana to develop a filing driven by that state's 2022 passage of EV program-enabling legislation (House Bill 1221). At the same time, at the federal level, implementation of the Volkswagen emissions settlement and the Infrastructure Investment and Jobs Act were underway, and implementation of the Inflation Reduction Act was being designed. AES recognized, in its words, "a unique opportunity to address core system reliability and manage rate impact by shaping the associated charging energy and demand in a cost-effective manner."

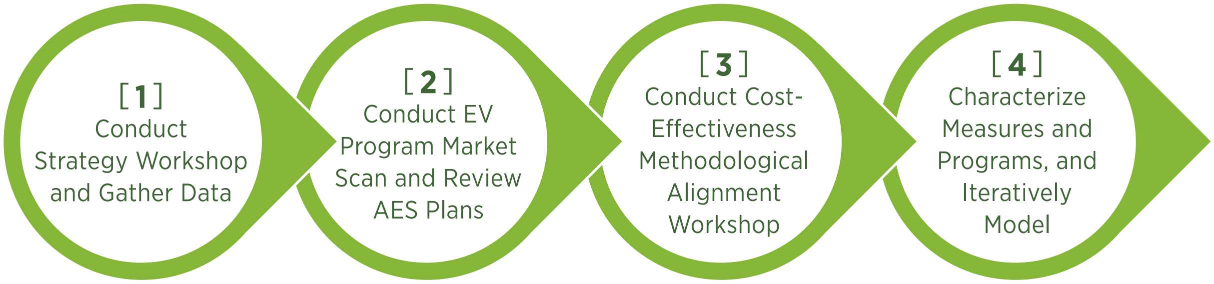
AES decided to propose EV program portfolios in both Ohio and Indiana and seek cost recovery for them. It sought to do so by leveraging its experience with electric vehicle supply equipment (EVSE) rebate programs in Ohio and EV charging rates in Indiana. AES included an EV portfolio in its Ohio ESP filing and made a standalone filing for approval, including cost recovery, of an EV portfolio in Indiana.

Both filings required cost-effectiveness analysis to prove the AES claim that recovery of costs for the EV portfolios was in the best interest of customers. But how should cost-effectiveness be calculated for an EV portfolio? AES turned to MCR for assistance.

APPROACH

MCR's engagement began with a client-provided portfolio of programs and other interventions (e.g., rates, advisory services, turnkey EV packages,[1] etc.), driven by AES's integrated resource plan (IRP) and other planning processes, and executed defensible cost-effectiveness testing that would support regulatory approval with cost recovery. That is, MCR worked with client-provided design, including measures, savings, and costs, to 1) characterize the utilities' programmatic interventions and 2) configure the cost-effectiveness modules of the beneficial electrification variant of our Excel-based Local Energy Efficiency Planning model (LEEP-BE). At a high level, the approach consisted of the steps shown below.

MCR Summary Approach



Step 1: Conduct Strategy Workshop and Gather Data

EV and EVSE are nascent markets, and standard practices on the role of utilities in the EV space do not yet exist. For this reason, "doing homework" and coming to alignment with our client on a strategy was imperative to this collaboration. Data gathering included assembling a history of AES's recent, related strategic and regulatory activity; investigating current legislative, policy, and regulatory influences; and identifying likely intervenors in the planned filings and their positions or agendas.

Step 2: Conduct EV Program Market Scan and Review AES Plans

MCR performed a cost-effectiveness analysis in context of the broader market and AES's strategy. A thorough market scan revealed the nascency of these markets, utility interventions in them, and the impacts of EV and EV charging on resource and system planning and investment. Assessing AES's plans was equally as important; quite simply, if the cost-effectiveness analysis did not meet the client's specific needs and address the client-specific risks, regulatory approval would matter little. Together, MCR and AES honed their plans and reached a common understanding of the program designs, assumptions, and mechanics upon which the cost-effectiveness analysis would depend.

1 Turnkey EV packages offer, for example, an EV, registration, insurance, and charging through a lease with a single monthly payment.

Step 3: Conduct Cost-Effectiveness Methodological Alignment Workshop

Steps 1 and 2 established alignment on the “what” of AES’s EV plans. In Step 3, MCR compiled that intelligence and conducted a workshop with AES to align around the specifics of how, methodologically, MCR would model cost-effectiveness. To conduct cost-effectiveness testing for EV and EVSE, myriad assumptions and directional choices are required since utility intervention in the EV and EVSE markets is distinct from traditional energy efficiency and demand response interventions.

For this analysis, MCR recognized that economic assessment of EV and EVSE programs based solely on the traditional primary reference for energy efficiency cost-effectiveness, the California Standard Practice Manual (CSPM), was not entirely appropriate given the emergence and rapid embrace by regulators and energy, environmental, and social justice advocates of the National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources (NSPM-DER). The NSPM-DER focuses on broadening the lens through which cost-effectiveness is considered—from an energy-only perspective to a holistic one—based on explicit acknowledgement of, and agreement on, the policy drivers in play, the full range of costs and benefits, and symmetrical treatment of costs and benefits.

The tests ultimately conducted for the AES EV portfolios were the Total Resource Cost (TRC) Test, Societal Cost Test (SCT), Participant Cost Test (PCT), and Rate Impact Measure (RIM) Test as described in the CSPM. However, consideration of the NSPM led to a revision of the specific data elements to be included in quantifying the costs and benefits of EV and EVSE programs.

With EV and EVSE, we ask not “How much load can we take off the system and customer bills?” but rather “How do we optimize the additional load that will be added to the system and customer bills?” This is an important shift, and it required AES and MCR to come to agreement on many aspects of characterization and quantification, as discussed in Step 4.

Step 4: Characterize Measures and Programs, and Iteratively Model

Step 4 consisted of configuring and executing the LEEP-BE model to reflect what was discovered in Steps 1 through 3. In consultation with AES, MCR finalized characterization and quantification of the EV and EVSE measures to be screened for cost-effectiveness, and populated the LEEP-BE model accordingly. To do so, MCR and AES reached alignment on questions such as:

What is the incremental cost of EV and EVSE?

- What is the first cost of EV versus internal combustion engine (ICE) vehicles, net of tax incentives?
- What is the operating cost of EV versus ICE, considering fuel, operations, and maintenance?

What are the demand and energy impacts of EV versus ICE vehicles?

- From a Total Resource Cost Test perspective, how many BTU, regardless of energy source, are being consumed by EV and ICE vehicles?
- From a Rate Impact Measure Test perspective, how much load is being added to the utility system? What is the timing of that load? What are the utility costs and revenue, and what are customer bill impacts?

What are the CO2 emissions impacts of EV versus ICE vehicles?

- What is the fuel efficiency of the EV or ICE vehicle in terms of kWh per mile (EV) or miles per gallon (ICE)?
- What is the CO2 content of the electricity consumed or the fossil fuel consumed?

Answering these questions, and others, drove the inputs and the mathematics of cost-effectiveness testing. This also required alignment around such topics as avoided costs of electricity and fossil fuels, vehicle mix (light duty and Class 1 to Class 8), annual miles driven by class, interest rates, etc. The modeling process, as is always the case with cost-effectiveness work, became an iterative process of tuning and adjusting programmatic and input/data assumptions to arrive at the final program designs, assumptions, and analyses.

RESULTS

AES successfully filed its EV portfolio proposals in both Ohio and Indiana. MCR sponsored testimony that was specific and limited to cost-effectiveness analysis in support of an Ohio budget of $7 million and an Indiana budget of $8.9 million for full program year-one implementation. In each state, $3.5 million of budget was for opt-in programs to be fully funded by participants only. The remaining $3.5 million for Ohio and $5.4 million for Indiana was to be recovered from all customers through EV program tariff riders.

In both states, the Rate Impact Measure Test was treated as the primary cost-effectiveness test, supported by the Participant Cost Test as secondary. In Ohio, AES also filed the Societal Cost Test benefit-cost ratios (BCRs), and in Indiana, AES also filed the Total Resource Cost Test BCRs. The filings demonstrated that all programs in both states were cost-effective, with BCRs greater than 1.0 except for certain programs serving income-eligible or disadvantaged communities. This is typical throughout the industry for programs serving these sectors because these populations are recognized as requiring more assistance than others. The portfolios include some or all of the elements shown in the table on the next page.

EV Portfolio Elements

Residential	Low-Income/Disadvantaged	Commercial/Industrial
Managed Charging Off-Peak Incentive	Managed Charging EVSE Rebate	EV Subscription EVSE Rebate Fleet Solutions Tariff-Based Lease

In addition, the proposed portfolios included a bi-directional charging (i.e., vehicle-to-grid) pilot in each state.

AES filed the EV program portfolio in Ohio as part of its much larger electric security plan (standard offer/default electric supply) case. The Ohio settlement was approved in an order by the Public Utilities Commission of Ohio on August 9, 2023, including approval of the Residential Off-Peak Incentive program. The standalone EV portfolio proposal in Indiana was approved in its entirety by the Indiana Utility Regulatory Commission on November 22, 2023.

For more complete detail on MCR's work with AES on cost-effectiveness of its EV and EVSE programs, see the MCR testimony filed in Ohio and Indiana.

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